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EDITED BY
THE STAFF OF THE ROYAL NAVAL MEDICAL SCHOOL
ALVERSTOKE HAMPSHIRE

Editorial

SPRING will be a little early this year. Our observant readers will have noticed that, departing from custom, the first issue of the JOURNAL is labelled "Spring" instead of "Winter". The editors trust that Mother Nature will forgive them for dispensing with the winter though after her efforts last year she can expect little else. It has always seemed illogical that the four issues should be WINTER, SPRING, SUMMER, AUTUMN. This order has now ceased and the conventional sequence of the Seasons will from now on be the accepted practice. We only hope that the long term weather forecasters will have noticed this change.

Once more it is our privilege to bring together a series of first-class papers which were presented to the Joint Schools Symposium at Seafield Park last November. This has now become a well-established practice and it is encouraging to realize that the Naval Medical Service has a worthwhile contribution to make to Medicine in general. Only the limitations of space prevented a much larger attendance at the symposium, but it is hoped that by publishing this collection of papers, a wider appreciation will be achieved.

In the face of rising printing costs and a diminishing demand for advertising space the JOURNAL OF THE ROYAL NAVAL MEDICAL SERVICE is only hanging on to solvency by the skin of its teeth and it is unlikely that issues in the immediate future will exceed 56 pages which is an economical size. This is regrettable because there is no shortage of interesting and instructive material. One of the saddest reflections however is that there is still a very large number of serving Medical and Dental Officers who do not take the JOURNAL in spite of the fact that the subscription has remained at 20s. a year (10s. for Dental Officers and Surgeon Sub-Lieutenants) since its first issue in 1915. This subscription (subject to tax relief) will only be raised as a very last resort. This may well be averted if subscribers will help in every way possible to make the JOURNAL more widely known and, if the opportunity arises, encourage potential advertisers to take advantage of the relatively low cost of available space. The JOURNAL is, furthermore, quite self-supporting and independent of outside help.

Papers

[redacted] Paper read at the Joint Symposium presented by R N Medical School at Scalield Park on Tuesday, 26th and Wednesday 27th November 1963

THE OVERWEIGHT AVIATOR AND DECOMPRESSION SICKNESS

By Surgeon Commander D C McNUTT, M.B.E., M.B., Ch.B., R.N

The way to a man's heart is reputedly through his stomach but it is the purpose of this article to show that the stomach or its intake may also be affecting some careers in Naval Aviation

With present-day power controls, flying requires little physical effort apart from those sorties requiring repeated application of acceleration By driving to work or being confined in a ship aircrew tend to have little opportunity or inclination for exercise The result of this in some individuals, is a gradual increase in weight in the form of excess body fat The question that needs answering is does this really matter?

To answer the question fully, a short consideration of the syndrome of decompression sickness in aviators is necessary

Decompression sickness may be defined as symptoms developing at altitude not due to hypoxia or other identifiable disease The occurrence of these symptoms in flyers has been recognized since 1929[6] and their similarity with the diver's syndrome noted

In order to eliminate the most susceptible individuals the testing of Naval aviators in a decompression chamber has taken place since 1944 This test became a firm requirement for all undergoing high altitude flying in 1950 and the test was standardized into three one hour runs at 37 000 ft every four years The test is familiarly called H A S T for High Altitude Selection Test in the Royal Navy

The most common symptom is a skin itch followed by pain of a deep burning character usually round the larger joints e g shoulder elbow and knee These symptoms nearly always clear on returning to a lower altitude

A more serious syndrome of difficulty with inspiration chest pain and a short uncontrollable cough, sometimes with a feeling of impending collapse is known as "chokes" It occurs next in the order of frequency of symptoms developing during the H A S T

The next group develop a collapse-like state without any definite localizing signs A further small group with definite C N S signs e g scotomata mono and hemiplegia is recognized

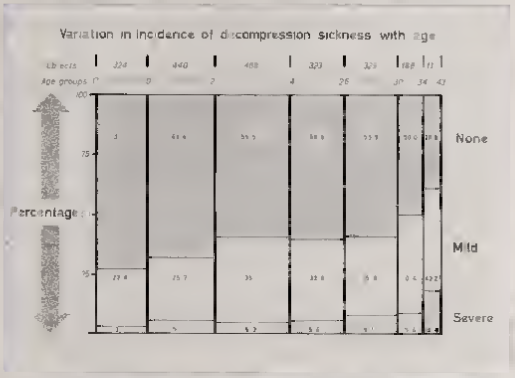
In these latter three groups the symptoms are classified as severe and may not clear on return to ground level There can be progression to death, but it is extremely rare Mason[7] records 17 deaths from the British American and Canadian experience Six of these men were never above 30 000 ft. and seven had less than 30 minutes above 25 000 ft

There are many factors to be considered in the etiology of [illegible] but in the brevity the limit will be three factors.

(1) *Altitude and Time.* The lowest recorded altitude at which symptoms have been described is 18 500 ft after 9½ hours and 22 000 ft after 18 hours[4]. These are rare cases. Above 30 000 ft the incidence of symptoms increases markedly and it goes on increasing with altitude. Some collapse at or shortly after reaching a particular altitude while others may tolerate several hours at the altitude before the onset of symptoms.

(2) *Age.* Table I shows the incidence with age in the Royal Navy on men during their first pressure chamber test.

TABLE I



Some particularly those in the older age groups may have had considerable high altitude flying experience before this test was done on them. The increase in severe symptoms after the age of 26 and particularly after age 34 is important. The majority of those with severe symptoms were suffering from chokes.

(3) *Weight.* Clinical observation[1,2,5] has repeatedly stressed the importance of the overweight individual in this condition. Table II shows the amount overweight of the severe cases compared with those who are the same age and height.

TABLE II

Excess weight in lbs. of severe cases over symptom free men of same age and height

	Severe Symptoms	
	Chokes	Other
First Test	10·9 ± 5·2	3·9 ± 3·9
Second Test	23·2 ± 4·6	3·0 ± 2·2

The excess weight is particularly apparent in those suffering from chokes (the majority) and is more so after the retest, which takes place at a time when the man has had four years of flying.

Discussion

The result of the High Altitude Test does affect the aviator's career. If he develops severe symptoms he is excluded from further high-altitude flying, and he is thus restricted in the types of aeroplane that he can fly. The restriction is to 3 000 ft. and considering the importance of time at altitude as well as the very low altitudes at which symptoms have been described this restriction may be too generous.

Ageing as can be seen from Table I is a very important factor in the development of severe symptoms, however as Medical Officers we can do little about it.

Table II indicates that increased weight is particularly important in the development of chokes, and chokes is the commonest symptom complex in severe decompression sickness. It seems reasonable to suppose that if these men had been at the average weight for their group they would not have developed symptoms. It is this group that the Medical Officer can help by insisting that aircrew be at or close to their standard weight.

It should be noted that this excess weight may only be an indicator of a general lack of exercise and hence poor muscular and vascular tone, as there are studies which show that the obese move about less than the lean.

The answer then for the rather plump aviator must be that overweight is important. It is hoped that this will be a sufficient stimulus to help him to reduce, and aid in one of the rather difficult tasks of medicine, that of getting the unwilling to lose weight.

Summary

A chart of the incidence of decompression sickness with age in 2,203 Naval aviators and a chart demonstrating the increase in body weight in those suffering from chokes is presented. It is concluded that the obese aircrew have an increased liability to chokes.

The opinions expressed are those of the author and are not to be taken as official policy.

Acknowledgement to all the Medical Officers who have served at the Royal Naval Air Medical School and who have helped in collecting the data, and in particular to Surgeon Lieutenant-Commander Hatfield for Table II and for helpful criticisms.

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THE PENSACOLA SLOW ROTATION ROOM

with Special Reference to Disorientation and Motion Sickness in Space Flight

By Commander S. C. DUNN, U.S.N.

Introduction

During the course of the past several decades many investigators have studied the illusory experiences, autonomic nervous system reactions, and the many other signs and symptoms which appear in man and animals as a result of motion. Still there are many questions to be asked, many answers to be given, and many conclusions to be drawn. The report that I am presenting today deals with contributions from the Pensacola Slow Rotation Room with special reference to disorientation and motion sickness in space flight. It is recognized that this is only one small part of the large field of space flight physiology.

Undoubtedly sensory illusions and motion sickness were known to the earliest of humans. Seasickness, for example, has caused a tremendous amount of disability and suffering during the many centuries that man has used boats and ships as a means of travel. The development of the railway train and the automobile with their greater speed did not materially increase the adverse effects of motion; in fact, these were lessened. On the other hand, when man left his more or less two dimensional movement on ground for the three dimensions of aerial flight, he not only lost constant physical contact with the Earth's surface or structures thereon, but he also met with a force environment which made this form of travel, to say the very least, frequently stressful and many times deadly.

Force Environment in Space Flight

With the advent of manned space flight new acceleration problems were anticipated; disorientation and motion sickness were considered with renewed interest.

At this point a brief description of the organs of equilibrium of the inner ear may be helpful in understanding requirements for some of the devices to be subsequently mentioned in connection with the force-environment of space travel. Speaking only of the vestibular apparatus should not be construed to mean that other perceptual organs such as the eyes and the proprioceptive receptors are not important; most of all it is not meant to ignore the very important alerting and integrating mechanisms of the central nervous system.

The Vestibular Apparatus

The non acoustic portion of the inner ear or the vestibular apparatus has been likened to a part of an inertial guidance system in missiles and submarines.[1] It is really comprised of two types of organs: (1) the semicircular canals and (2) the otolith system.

1. The *semicircular canals* consist of three loops oriented in three mutually perpendicular planes which are connected in common to an irregularly shaped sac like chamber called the vestibule. These canals are filled with endolymph and in the ampullæ or dilated ends of each canal is a cupola-like structure with hair cells at its

base these hair cells act as a transducer converting the force of the moving fluid into neural impulses.

2. The *otolith organs* are found in two small sacs within the vestibule of each ear. Of the two sacs, the upper posterior sac is called the *utricle* and the lower anterior sac is called the *saccule*. Both sacs contain sensory plaques called *maculae* which are flat thickenings on the inner walls. The maculae are made up of small calcareous crystals (otoliths) poised on hair cells. Both the otoliths and the hair cells are enclosed in a gelatinous membrane. Controversy exists as to whether the otoliths stimulate the hair cells by pressure, traction, and/or gliding.[5] Here again the hair cells act as a transducer converting the force of the otoliths into neural impulses.

The semicircular canals are normally stimulated by angular acceleration.[5,8] The otolith system is generally considered to be a primary detector of rectilinear acceleration, however, there is some thought that because of the distance between the otolith organs of the two ears, information may be provided about angular acceleration.[5,8]

Force-environment Categorized

The force-environment of space travel can be placed into three categories according to the manner in which disorientation and/or motion sickness is effected. These are: (1) High linear acceleration, (2) Subgravity or lack of gravity, and (3) Rotation.

1. *High linear acceleration*. In order for a space vehicle to enter an orbit or escape from the Earth's gravitational force, the effects of the force-environment are those of high linear acceleration — or high deceleration in the case of re-entry into the Earth's atmosphere. As long as the head is not moved from the plane of linear acceleration, the otoliths are the part of the non-acoustic labyrinth which is stimulated.[1,9,10] Prior to manned space flight, many human centrifuges were in existence and the profiles for the high G forces (one G is the unit of force equivalent to the Earth's gravitational pull) of launch and re-entry could be easily simulated. The Mercury astronauts, for example, were trained to perform certain required tasks simulating the high G loadings of their space flights at the U.S. Navy's human centrifuge at Johnsville, Pa.[9]

2. *Subgravity or lack of gravity*. Weightlessness has proven to be a rather difficult entity to study in that there seems to be no way of building a device which simulates this decreased or absent force-environment. Such experimental procedures as water immersion, a drop tower, and a subgravity tower have been used,[1] but the most realistic approach prior to actual space flight was performed by having aircraft fly various parabolic trajectories.[8,1] The disadvantages of this latter type of experimentation is that the period of weightlessness is short and it is always "contaminated" by the accelerative forces preceding and following the anti-gravity state.[1] Under these circumstances it is very difficult to separate the ill effects caused by accelerations from those caused by weightlessness *per se*. Of course, one might consider that space flight is also preceded or followed by phases of increased G's, but there are several differences in type, duration, and amount.

Early studies with subjects restrained during the weightless period seemed to indicate that motion sickness would not be a serious obstacle; however, the situation changed somewhat after experiments were started with unrestrained subjects during subgravity parabolas.[1] Finally, when Gherman Titov, the Russian cosmonaut, became

[illegible] significance. The following is quoted from a report by Gretchko and Yazdovsky to the Russian Academy of Sciences Moscow [4]

"Titov noted some important symptoms In conditions of weightlessness unpleasant sensations of the vestibular character were felt stronger and stronger, especially when the cosmonaut sharply turned his head or was observing swiftly moving objects After some period after sleep these phenomena decreased but did not disappear before the beginning of the action of overloads during the ship's recovery to Earth Thus the sensation of some discomfort accompanied the considerable portion of the flight and resembled seasickness

While the illness may have been partly due to the absence of the weight of the otoliths on the sensitive cells of the macula most certainly angular acceleration with its effect on the semicircular canals accentuated the malady[1]

3 *Rotation* At least as early as 1955 scientists have been suggesting that manned orbiting satellites should be rotated at constant angular velocity in order to use inertial force to produce an artificial gravity state [12] It may not be worthwhile to do this for short flights On the other hand it may be efficacious to overcome weightlessness during prolonged space flights for a number of reasons such as difficulty in swallowing food and drink and the necessity of keeping dust, bacteria perhaps vomitus and other materials at foot level to prevent aspiration into the lungs Since the rate of rotation would not be great enough (intentionally) to create G-tolerance problems, the principal concern is disorientation and the sickness which would be generated by this unusual pattern of stimulation of the vestibular system [2 7 12] The fact that such a stimulation by head movements during rotation can be very disturbing has been well established [7, 8] Another aspect of prolonged space flight is the need at times, to be able to move about the vehicle Keeping all of these things in mind a rotating room which would allow for unrestrained movement and which would simulate as nearly as possible the contemplated inertial forces in manned orbiting satellites was built at the U S Naval School of Aviation Medicine in 1959 Although many laboratories in Europe, Canada and the U S A had been very actively using rotational devices for vestibular experimentation for a great many years, this is believed to be the first time that such a device was constructed which would allow for unrestrained movement of several subjects over a prolonged period of time The device was soon to be named the Slow Rotation Room

The Slow Rotation Room

The Slow Rotation Room (Figure 1) is a 12-sided almost circular, windowless structure having a diameter of 15 feet and a height of 7 feet It is mounted on a central platform, 20 feet in diameter constructed around the centre post of what had been the Pensacola Human Centrifuge Beneath the superstructure is a 35 ton flywheel which can be engaged slowly and smoothly to the motive power, a gasoline engine At first, rotation was limited to 10 r p m– but later the superstructure was strengthened to allow for more than double the previous speed Because of the great inertia of the flywheel and superstructure, the variations in angular velocity are within a plus or minus 2 5 per cent of the desired velocity The room can be smoothly accelerated and

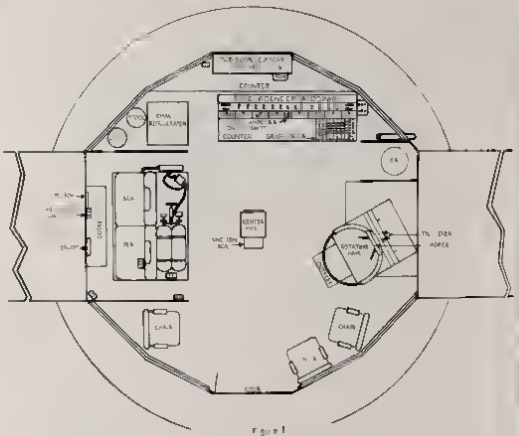


Figure 1

decelerated. After the desired velocity has been attained, the rotation is completely free of abruptions and the platform is level and stable so that the subjects are unaware of any rotation unless they move their heads. Voice communications, power, and physiological data can be electrically transmitted by means of slip rings on the axle. Furnishings include seats, a refrigerator, cooking facilities, a sink with a cold water tap, a toilet, sleeping accommodation for four, and a variable amount of laboratory equipment. Also, at one time, a specially constructed tilt chair was mounted in the room so that the subject's head was approximately four feet from the centre of rotation.

The Stimulus Pattern

Because of the zero angular acceleration of the S.R.R. (Slow Rotation Room) at constant velocity, there is no stimulation of the semicircular canals as long as the subject's head remains fixed. This, of course, is not true when starting and stopping the run. Moreover, movements of the head in a direction parallel to the axis of rotation does not stimulate the canals. Also, turning the head about an axis parallel to the axis of rotation results in almost the same pattern as if the room were stationary. Although these movements are theoretically possible, the actual fact is that it is almost impossible to move the head perfectly enough to achieve them.[2]

An abnormal stimulation of the semicircular canals is brought about aboard the

S R R by [illegible] the head [illegible] this other than the [illegible] In effect this [illegible] that the head is tilted relative to the [illegible] a rotation is at constant angular velocity such a movement invokes the [illegible] acceleration described by Schubert and attributed to the physicist Coriolis[15] Frequently the result is a very disquieting feeling of rotation which may be accompanied by a great variety of neurovegetative responses among which are nausea and vomiting This syndrome is known as the Coriolis phenomenon and it is the specialty of the S R R

Symptomatology

The Coriolis acceleration abnormally stimulating the semicircular canals has far reaching effects through the internuncial connections of the central nervous system and as a result a great variety of psychophysiological signs and symptoms may be induced These pervasive neural impulses are mediated by the following centres*

1 The control centres which modulate the proprioceptive impulses

2 The autonome centres bringing into play the parasympathetic and sympathetic nervous systems

3 The reticular formation with its monitoring integrative and alerting mechanisms and

4 The cortical and subcortical areas influencing perception and emotion

Moreover the effects are not limited to manifestations mediated directly by the nervous system there are neurohumoral effects, also

The term "canal sickness" has been proposed to designate this illness caused by abnormal stimulation of the semicircular canals Nausea and vomiting probably can be considered the cardinal symptoms of canal sickness however the syndrome is much larger than this. The signs and symptoms usually develop in a fairly orderly sequence which allows for grading according to their onset as follows

Grade 0 Normal activity with usual alertness.

Grade I Reduction in activity and alertness carelessness apathy, visual and postural illusions and difficulty in walking

Grade II Drowsiness yawning, salivation 'stomach awareness and headache

Grade III General malaise nausea cold sweating, and facial pallor

Grade IV Vomiting or retching and oliguria

Grade V Circulatory collapse

This is truly a functional disability requiring no previous pathology Nearly everyone is susceptible but with striking individual differences Not all symptoms or grades of symptoms necessarily appear in each subject Grade V is an uncommon occurrence but it has been witnessed by this reporter and thus was without the prodromal appearance of grade IV symptoms Symptoms usually disappear quickly following cessation of the stimulus The sequence of disappearance is usually the reverse of the order of appearance i e the higher graded symptoms as just presented are first to go with the lower graded symptoms persisting sometimes for many hours

* Adapted from Ref 8

Experimental studies

Since the [illegible]-symposium report is inevitably limited present discussion of experimental studies performed on the S R R will be dealt with in a rather general and superficial fashion. Both humans and animals have been used and comparisons have been made. Studies include such terms as (1) Threshold (2) adaptation (3) habituation, (4) after effects (5) symptomatology and (6) individual variation [2 7 8 14]

1 *Threshold studies* A variety of animals such as squirrel monkeys, chimpanzees, mice, rats, ground squirrels, raccoons, possums and even gold fish have been subjected to rotation [14] The stimulus threshold required to produce motion sickness has been noted in most of these. It has been found that the squirrel monkey is particularly susceptible to canal sickness — perhaps surprising in such an acrobat. Studies using human subjects have demonstrated that pilots who fly high-performance aircraft are quite resistant, the Mercury astronauts are in this resistant category.

2 *Adaptation studies* Adaptation may occur in the course of minutes, hours or days in most subjects, although it may not be complete even with prolonged exposure [8] There is much similarity in rate and degree of adaptation between the chimpanzee and man. Squirrel monkeys have demonstrated the ability to adapt to slow rotation at a much faster rate [14]

3 *Habituation studies* Habituation occurs in the sense that repeated exposures lower the intensity of the symptoms of most subjects [8]

4 *After effects* In studies involving humans, post rotation effects subsequent to adaptation have been frequently observed on cessation of rotation. These effects include fatigue, difficulty in walking and nausea. [2, 7] After-effects have been observed in squirrel monkeys, but not in chimpanzees [14]

5 *Symptomatology* Symptomatology has already been presented, but it should be added that signs of illness exhibited by animals are similar to those seen in man and include expressions of drowsiness, reduction in activity, the gastro intestinal sequence of salivation, vomiting and retching, and micturition.

6 *Individual variation* There can be no denying that individuals can vary widely in their resistance to the Coriolis stimulation. Aside from variation in the stimulus patterns, predisposing factors have been noted as (1) pattern of other sensory inputs, (2) basic individual susceptibility, (3) mental alertness, (4) state of fitness, including history of unusual vestibular stimulation, and (5) unfavourable environment [2 7 8 14]

The oculogyral illusion, the oculomotor nystagmic reaction, performance tests, and motion sickness questionnaires have all been related to the just-mentioned items in an effort to predict seasickness, air sickness and by inference, space sickness [9 11] Prediction has met with a certain amount of success [11]

One investigation in which this reporter has taken part has had as its basis the search for, and the study of, prodromal physiological changes, objective rather than subjective in nature, which would presage motion sickness — perhaps even before there is subjective awareness and certainly before there are manifest signs. Cold sweating, galvanic skin-resistance of the palm, skin temperature and body core temperature were continuously monitored by electronic equipment. Results have been interesting and promising, however in a different manner than was originally expected. The data still requires further processing before publication.

Conclusions

In summary the following conclusions are drawn

1 The advent of space flight has brought about new force environment problems

2 The force-environment of space travel can be placed in three categories in order to facilitate the selection of devices which can be used in the study of the various functional components of the vestibular apparatus

3 The significance for space medicine of vestibular experimentation lies principally in the fact that the vestibular ocular, and proprioceptive systems comprise a powerful perceptual triad which must be properly understood and controlled to prevent disorientation and motion sickness in space environment

4 Coriolis acceleration stimulation can occur in man in rotating space vehicles and the psychophysiological manifestations will be the same as those occurring on the S R R

5 The Pensacola S R R offers a means of studying the etiology psychophysiology and the control of motion sickness and disorientation of all types in so far as Coriolis acceleration contributes to the symptomatology

6 Canal sickness studies on the S R R can be closely related to motion sickness found in any type of transportation regardless of whether the latter is produced by linear or angular acceleration a combination of the two or a lack of the acceleration of gravity

7 The Pensacola S R R is believed to be unique among devices which rotate in that it allows for unrestrained movements of several subjects over a prolonged period of time

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THE MECHANICS OF RESPIRATION AT INCREASED AMBIENT PRESSURES

By Surgeon Lieutenant-Commander A. S. JARRETT, R.N., R.A.F. Institute of Aviation Medicine, Farnborough

THE physiological problems which face the man who wants to dive deep below water fall into four main categories, oxygen toxicity, inert gas narcosis, decompression sickness and altered mechanics of respiration. The problem of avoiding oxygen toxicity is now entirely a technical one. The safe upper limits for oxygen partial pressure have long been known as have the dependance of these limits on duration of exposure. It is now a question of designing machinery which will deliver and maintain a pre-set oxygen partial pressure. Inert gas narcosis is not quite so simple, but the general rule is clear; replace the high atomic weight gases with those with lighter nuclei. They are certainly less narcotic and almost as certainly this is an intrinsic feature and not as some have claimed, a function of their densities. Experience with helium and hydrogen (the only candidates) may reveal shortcomings, so far the very limited knowledge of these gases is confined largely to the peculiarities of their associated decompression syndromes. Decompression sickness has always been, and looks to remain, the major hazard in diving. Despite innumerable attempts, theories have failed to predict with safety, and experiments at greater depths have indicated depressingly long minimum times for safe decompression. Compared with narcosis and decompression sickness the mechanical effects of increased pressure are less dramatic and have consequently been very little investigated. But it is just because of this widespread neglect that it seems to me worth while to outline the problems and indicate how they may be investigated without, however, pretending that they are the most important of present-day diving research problems.

Everyone who has been under pressure knows that something odd happens, at quite shallow depths. 10-30 feet, the ability to whistle disappears. Round about 100 feet most people can feel air swirling through their mouths like a liquid as they inspire, while at 200 feet the increased density can even be felt by waving one's fingers in front of one's face. To break down the effects of this density change on the respiratory mechanism we must consider the components of normal respiratory resistance, viz.

1. Elastic resistance
2. Non-elastic resistance
 (a) tissue non-elastic resistance
 (b) airway resistance
3. Inertial resistance
 (a) gas inertance
 (b) tissue inertance

1. *Elastic resistance*

This applies to the elastic elements in the lungs and chest wall, and by definition is proportional to the degree of distortion and not its rate. Since the elastic elements

are all fluids and hence incompressible no change will be effected by an increasing pressure *per se* Immersion in water is more than just increase in pressure however Hydrostatic pressure produces an external pressure gradient where none exists in air This has three measurable effects If respiratory work is to be minimized then the end tidal point must move until the elastic forces tending to expand the chest just equal the hydrostatic forces tending to collapse it Thus position of least respiratory work obviously entails muscular relaxation and Fig 1 demonstrates the process

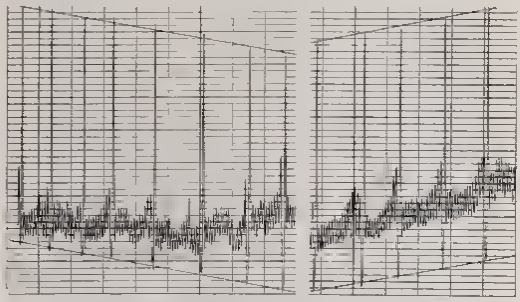


Fig. 1. The traces reads from right to left. The right hand portion shows the tidal excursions of the chest breathing while standing upright in air. On which are superimposed five estimations of vital capacity (the deep inspiration upwards, expiration downwards). The left hand trace shows the respiratory excursions of the same subject immersed to the waist in water with eight superimposed estimations of vital capacity as above. The smaller horizontal divisions represent 100 ml. and the vertical divisions one-minute time intervals.

The trace which reads from right to left, shows several estimations of vital capacity in air The left-hand trace from the same subject now floating supported in water shows a progressive increase in inspiratory reserve volume at the expense of expiratory reserve which ultimately disappears The crucial observation is that meanwhile the vital capacity does not change i e the change is entirely ascribable to a shift in end tidal point due to non-muscular elastic features of the chest wall (Jarrett, 1963a) The second effect of immersion involves intrapulmonary pressure The volume changes shown in Fig 1 can be prevented by the provision of gas at a pressure equal to the integral of the external hydrostatic pressures per unit area, over total area These pressures have been measured (Jarrett 1963b) and shown to be $+19$ cm H_2O relative to the sternal notch (vertical) and $+7$ cm H_2O (prone) The third effect of submersion is a geometric distortion of the chest It is quite unavoidable that the deepest parts of the chest will suffer some compression at the expense of a corresponding expansion of the most shallow This effect is measurable but for all practical purposes negligible (Jarrett 1963b)

2 *Non-elastic resistance*

(a) *Tissue non elastic resistance* As these tissue elements are fluid they are unaffected by pressure The question of distortion by hydrostatic gradients does not apply of course as non-elastic resistance is determined only by rate of change of position However what must be considered is the viscous effect of the water itself when it surrounds an immersed chest In a sense the whole ocean can be regarded as an extension of the diver's chest tissues—when he breathes in not only does his diaphragm descend but sea level rises! It is hoped to measure the effect by recording the difference in total non-elastic resistance when breathing both "wet" and "dry" at equivalent increased pressures It has been shown by a variety of methods that the tissues provide only a small part of the total non elastic resistance—about 0 2 cm. H_2O/L/sec in a total of 1 2 cm H_2O/L/sec so that non elastic resistance is very largely determined by gas changes while in a gaseous environment

(b) *Airway resistance* Rohrer (1915) described the gas resistance of the respiratory tract by the relationship $\Delta P = K_1(V) + K_2(V)^2$ Now if the relationship between ΔP (driving pressure) and V (flow) is experimentally determined then the constants K_1 and K_2 can be calculated from one point on the curve The *theoretical* curve can then be drawn and it is found to coincide exactly with the experimental one, which seems to confirm Rohrer's equation and his basic assumption, i e that K_1 and K_2 are indeed constants Rohrer derived his relationship from the knowledge that flow in the respiratory tract would be partly laminar (in which flow is directly proportional to the driving pressure) and partly turbulent (in which flow is proportional to the root of the driving pressure) hence the V and $(V)^2$ terms respectively in his equation Now turbulent flow resistive pressure is a function of gas density, and is independent of viscosity while in the case of laminar flow the resistive pressure is determined by gas viscosity and is unrelated to density Further, since increasing the pressure of a gas increases its density in direct proportion but under isothermal conditions does not affect its viscosity increasing pressure should *increase* turbulent resistive pressure, but not affect the laminar component of resistive pressure at all Thus for a series of determinations at say, 1 2 3 and 4 atmospheres if resistance (i e $\Delta P/V$) is plotted against flow (V) we should expect, on the basis of Rohrer's equation to obtain a family of curves with the same intercept on the $\Delta P/V$ axis, but varying slopes (K_2) In fact this has not been observed on the contrary both the slopes and the intercepts vary widely (Marshall, Lanphier and DuBois 1956) Why does Rohrer's equation so exactly fit the findings at normal atmospheric pressure but fail completely to do so at increased pressures?

To find the answer we must consider what determines whether flow is laminar or turbulent The crucial determinant is a dimensionless number first described by Reynolds It is given by

$$\frac{(\textit{Linear dimension})\ (\textit{Fluid velocity})\ (\textit{Fluid density})}{(\textit{Fluid viscosity})}$$

and flow becomes turbulent when this ratio exceeds 1 160 measured in terms of the linear dimension taken (in the case of flow through tubes, usually the radius) It is now obvious that increasing the density of a gas does much more than increasing

the flow resistive pressure of the turbulent flow already present. By increasing Reynold's number it initiates turbulent flow in parts of the respiratory tract previously laminar and thus increases the *proportion* of turbulent flow. Thus Rohrer's 'constants' are constant only for a given pressure: if the absolute pressure varies then so do K_1 and K_2: they are related not only to viscosity and density respectively but to the geometry of the system concerned (i.e. the "linear dimension") and the absolute pressure.

In practical terms this means that not only do we not know how respiratory resistance will increase with increasing ambient pressure: but any theoretical prediction would be rash as the rate at which laminar flow changes to turbulent is unknown. Such estimates of airway resistance as have been made so far have been largely confined for technical reasons, to low flow rates (say less than 3 L/sec.), and the problem is hardly tackled here as in this range flow remains predominantly laminar. The substance of this section: the proportion of turbulent flow at different ambient gas densities and its consequent resistive pressure is the subject of research at present being carried out at the R.A.F. Institute of Aviation Medicine, Farnborough.

3. *Inertial Resistance*

At increased pressures the actual mass of the gas flowing increases and one would expect the forces needed to accelerate it would also be increased. In fact this increase has been shown not to exceed 2 cm. H_2O even at very rapid breathing at an ambient pressure of four atmospheres absolute (Mead 1956). For all practical purposes this is negligible. The same author points out that inertness extrapolates very closely to zero at zero pressure: which brings us to the surprising conclusion that considerably more work is done in accelerating the gas in and out of the lungs than in accelerating and decelerating the lung tissue itself: since the latter is so small as to be practically immeasurable. Although pressure *per se* has little effect on tissue or gas inertance as in the case of tissue non-elastic resistance, any surrounding water in contact with the chest must be regarded as part of the chest tissues: and the inertance of the water itself will add to the respiratory work. The method of determining the viscous resistance of surrounding water: which has already been mentioned, would in fact include the inertial effect.

* * *

Though this introduction to pulmonary mechanics at increased pressure may sound academic, it is certainly not *just* academic. Active plans and preparations are in progress in many countries for diving deeper and deeper. So far ignorance of respiratory mechanics under pressure has not seriously affected diving, but only one conclusion can safely be drawn—we have been lucky. It seems foolhardy to contemplate diving to 600 or 1,200 feet below the sea without knowing quantitatively what this is going to mean in terms of pressures and work required to shift gas in and out of the lungs. So with this justification the answers are being sought.

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PROLONGED EXPOSURES TO RAISED ATMOSPHERIC PRESSURES

By Surgeon Lieutenant-Commander E. E. P. BARNARD, R.N.

DURING the last few years diving research has entered a new phase in which the problem of extending the duration of a dive has become more important both as an end in itself and to give basic information which will allow diving to greater depths. This shift of interest is partly due to technical advances but more directly perhaps it is due to the difficulties met in trying to dive deeper. To understand what these difficulties are we must consider the progress made since the beginning of diving.

The Nineteenth Century

Diving for longer than a few minutes was only made possible by the "open" diving dress designed by Augustus Siebe in 1813; today most commercial divers use the "Standard" suit which is essentially the same as the improved "closed" suit made by Siebe in 1837. Using this new suit in 1840 a diver on the wreck of the *Royal George* is recorded as diving successfully for an hour at a depth of about 60 feet.

Sixty years later an exposure which proved fatal was one of 40 minutes at a depth of 147 feet. This diver used what was then the current method of diving which involved a slow descent taking 40 minutes in this dive followed by a steady ascent to the surface.

Triger the inventor of the caisson described the first two cases of caisson disease in 1841 in men who had been exposed in compressed air for 7 hours to a pressure equivalent to a dive of 66 feet.

Thus during the nineteenth century the duration of exposure to compressed air had been extended to what we now regard as a working day 7 to 8 hours for shallow depths, and dives were made to about 150 feet for much shorter times. Also by 1900 most of the physiological limitations to diving had been defined the three main ones being oxygen toxicity carbon dioxide poisoning and caisson disease.

Oxygen toxicity oxygen convulsions had been observed and investigated by Paul Bert in 1873 and the production in animals of a pneumonia after breathing oxygen at raised pressures was described by Lorraine Smith in 1898. It was appreciated that these hazards could be avoided by limiting the oxygen pressure to less than two atmospheres absolute.

Carbon Dioxide Poisoning Carbon dioxide or as it was then called carbonic acid gas was also recognized to be dangerous when present in excess and Professor J. S. Haldane designed more efficient pumps so that the carbon dioxide could be effectively removed from the diver's helmet by flushing through an increased flow of air. Nowadays the same result is achieved either by breathing the expired air out into the water or by absorbing the carbon dioxide with soda-lime.

Caisson Disease These syndromes are now collected under the title of Decompression Sickness but are often called "The Bends". Decompression Sickness was a considerable problem especially after long exposures or deep dives and its incidence was greatly reduced by J. S. Haldane who worked out the first stage method of decompression. In this method the diver ascends to the surface in a series of stages or stops as they are called each stop allowing time for the extra gas dissolved under

pressure to be evolved from the tissues and breathed out through the lungs. Although Haldane calculated diving schedules for longer times and deeper depths, he suggested limiting normal diving to a maximum of 12 minutes at 204 feet, which possibly accounts for the safety of his tables.

Diving since 1900

In 1935 Behnke and others described nitrogen narcosis, or as Cousteau calls it "ivresse des grandes profondeurs." Thus in addition to the already known restrictions set a limit to air-diving which, except for very brief exposures, is about 300 feet. Although the cause of these symptoms is still the subject of controversy, the cure is simple: to substitute another physiologically "inert" gas for nitrogen. Suitable substitutes for nitrogen are few, and only Helium and Hydrogen have been used with success. Some selected record dives are tabulated below to illustrate the advances due to the use of oxy-helium mixtures.

Selected Record Dives

Year	*Depth*	*Time*	*Breathing Mixtures*
1938	420 ft	10 mins	oxy-helium
1945	528 ft	10 mins	oxy-hydrogen
1956	600 ft	5 mins	oxy-helium
1961	728 ft	? 10 mins	not disclosed

Current Diving Tables

If one studies a graphical presentation of the regions to which we can dive with some degree of safety (Fig. 1), the most striking thing about this figure is the large blank area. Direct surfacing or no-stop dives, that is dives which need no decompression schedule, occupy a small fringe along the axes; hence most dives must be followed by a decompression schedule. The Royal Naval Diving Manual contains three tables of schedules for diving on compressed air, and the maximum dives allowed by these tables for a few selected depths are shown below.

Air Schedules

Depth	*Table I*	*Table II*	*Table III (a)*	*Table III (b)*
100 ft	55 mins	120 mins	—	—
150 ft	25 mins	90 mins	50 mins	5 hrs.
200 ft	15 mins	65 mins	35 mins	3 hrs.
300 ft	—	—	20 mins	1 hr

(NOTE. Tables II and III (b) are emergency tables and Table III (a) is rarely used.)

[illegible] not calculated by Professor Haldane it is clear that few divers will exceed an exposure of 15 minutes at 200 feet

An incidence of less than 2 per cent cases of decompression sickness is often achieved among Caisson workers, and it is interesting to compare the relative safety of the Diving Tables However, in order to compare short deep dives with long shallow dives one needs a measure which combines the parameters of depth and time A suitable standard of comparison may be provided by what I have called the Index of Relative Exposure (I R E) This is defined as the ratio of the duration of the dive to the duration of the no-stop dive for the same depth

$$\text{i e } I\,R\,E = \frac{t_{\text{dive}}}{t_{\text{no stop dive}}}$$

Some values for this Index are given to show the range covered by the Diving Tables

Index of Relative Exposure				
Depth	*Table I*	*Table II*	*Table III (a)*	*Table III (b)*
100 ft	0 7–1 8	1 8–4 0	—	—
150 ft	0 5 1 6	1 6 5 6	0 8–3 1	3 1 19
200 ft	1 –1 5	1 5 6 5	1 2–3 5	3 5 18
300 ft	—	—	4 –6 7	6 7 20

From this one can see that the I R E for all Table I dives is less than two, while Table II dives range from about two to nearly seven When we consider the incidence of decompression sickness we find that Table I gives an incidence of less than 1 per cent In Table II dives with an I R E of about two give an incidence of about 2 per cent while dives with an I R E of 3 5 give an incidence of about 8 per cent For one particular dive with an index of 4 3 the incidence of decompression sickness was 60 per cent

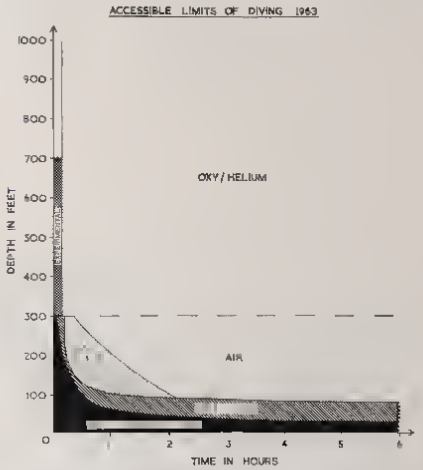
Deep dives on oxy helium mixtures using the U S Navy diving table, and various experimental schedules give an incidence of "bends" of between 20 per cent and 100 per cent This is particularly significant since the exposure time for direct surfacing from such dives is extremely brief about one minute total exposure, hence a 10-minute dive has an Index of Relative Exposure of about ten and might be expected to be hazardous

Modern Research

In spite of the difficulty research into deep-diving is continuing in several countries and the Royal Navy has successfully completed part of a five-year programme by diving a team of men to 500 feet for 15 minutes Although there has been more publicity given to long dives of hours or days the length of exposure is dictated by the role of the diver This means that naval divers will always be more interested in the short deep dives which allow them to do a particular job, rather than in underwater residence

Experiments in prolonged exposures have been carried out on both air and oxy helium breathing mixtures In an experiment conducted by Cousteau two men lived underwater for a week at a depth of 35 feet One of the most interesting findings of this experiment reported by Fructus was the development of anaemia and leucopenia presumably due to the raised pressure of oxygen in the compressed air Future experiments are therefore more likely to use oxy helium, or oxy helium-nitrogen mixtures in which the oxygen pressure will be kept to the normal level of 20 per cent of one atmosphere

Fig 1



The United States Navy and Edwin Link have carried out exposures on oxy helium mixtures of more than a day at 200 feet and deeper dives are planned It is perhaps not too far-fetched to expect dives of 600 feet for a week coming to the surface in about 24 hours to be attempted in the next few years but whatever new problems arise now as for Professor Haldane in 1907— The most serious difficulty in connection with deep diving is undoubtedly that due to the dangers of decompression—

EUSTACHIAN TUBE FUNCTION

By Surgeon Lieutenant-Commander R. R. A. COLES, R.N.

BEFORE acceptance for training as a diver, submariner or aviator a man has to pass a special medical examination. One of its most important facets is an estimation of his ability to ventilate the middle compartment of each ear by means of passage of air through the Eustachian tubes. This activity is commonly known as "clearing the ears".

The standard test employs the manœuvre described by Valsalva in 1704 in the following words: "It is performed by holding shut both sides of the nose and the mouth and by blowing out the cheeks with forcible expiration." However, anyone experienced in the use of this test will know that it has snags in its technique and interpretation.

The final arbiter a man's fitness is, of course, his actual performance in clearing his ears under pressure, and in cases of doubtful ability a trial run in a pressure chamber is often performed. Most medical officers, however, do not have this facility at their disposal, either because of distance or, as at Central Air Medical Board, because the R.N. policy with civilian candidates is to avoid the occasion of any procedure involving even the slightest hazard.

Based on a single clinical examination, one of the C.A.M.B. requirements is for a firm assessment of a man's ability to clear his ears. In the case of civilians, who form the majority of the C.A.M.B. material, certification of fitness allows entrance into the Navy to fly with a commission on the supplementary list. Should they subsequently fail on account of "ears", they are not readily employable in any other capacity because of their special terms of entry. This combination of factors gives little latitude for possible diagnostic error, and therefore necessitates a very critical study of the means by which such an assessment can best be made. Such a study provides the basis for this paper.

MECHANISM OF EUSTACHIAN TUBE FUNCTION

This is not as yet a matter beyond dispute, but the following theories seem to be in agreement with most of the known facts and reports on the subject.

Swallowing. One of the muscles involved in this act is the tensor palati. On contraction, the muscle fibres which arise from the bar of disto-cartilage lying over the outer two-thirds of the Eustachian tube bend the cartilage from being a little "r" in section to a little "n", and thereby pull apart the mucosal surfaces of this slit-like part of the tube. Then, if there is a low pressure existing in the middle ear relative to the nasopharynx, the only remaining hindrance to passage of air up the tube is the resistance of the tube, which normally requires an excess pressure of 4 to 10 mm. mercury (Hg) in order to overcome it. Relatively low pressures in the middle ear can occur not only as a result of changes in the external environment, but also by absorption of air through the mucosa of the middle ear. The latter is normally relieved by spontaneous swallowing movements, but if the tubal resistance is high, or is temporarily

raised as in [illegible] then a more persistent low pressure in the middle ear may develop

It should be noted that the power of the tensor palati to open the tube is not great indeed the muscle is not strong enough to overcome the tube-closing effect of comparatively small increases in pressure Compared with the Valsalva manœuvre swallowing is not only a slower method of clearing the ears but also a progressively less efficient one as the pressure differential between the surroundings and the cavities of the middle ear rises (Flisberg K Ingelstedt S and Ortegren U 1963) Usually the first method to fail with rising external pressure is swallowing finally though even the Valsalva manœuvre fails and the tube is described as having 'locked' (see below)

An acute coryza further reduces the efficiency of swallowing and other muscular methods e g trick movements of the pharyngeal muscles of opening the Eustachian tubes It can even render them virtually useless in spite of the fact that inflation methods as shown by a positive Valsalva test may still be operative

Decompression Unlike the outer two thirds of the Eustachian tube, which is supported on only half its circumference by a bar of elasto cartilage and whose mucosal surfaces are not easily separated by raised pressure in the nose the inner third is completely surrounded by bone and is patent A relatively raised pressure in the middle ear can therefore escape down the valve like Eustachian tube with no more difficulty than is occasioned by the already mentioned resistance of the tube A momentary slight reduction in the nasopharyngeal pressure may also result from swallowing whilst holding the nose the Toynbee manœuvre (1863)

Locking of the tube This occurs when the pressure in the rest of the body and round it rises by about 100 mm Hg without a compensating rise in the middle ear The soft tissues of the outer two-thirds of the tube are then pushed into the cavity of the inner third and thereby block it Once this has happened no muscular action or other manœuvre can possibly succeed in clearing the ear The only recourse is to lower the pressure differential to below 100 mm Hg and then clear the ears

Valsalva manœuvre Air is forced up the Eustachian tube when the pressure in the nasopharynx is raised above the ambient The rise is brought about by contraction of thoracic and abdominal muscles when the nose is held closed by the fingers or a clip The excess pressure normally needed for this is between about 20 and 50 mm Hg. Because this is greater than the resistance of the tube (4 to 10 mm Hg) it must be that part of the nasopharyngeal pressure is transmitted to the soft tissues surrounding the outer two-thirds of the Enstachian tube But the transfer must also be incomplete otherwise the forces pushing air up the tube would be equal to the forces closing the tube and as soon as the nasopharyngeal pressure reached the 100 mm Hg mark locking would occur On pure hypothesis therefore one can imagine that about 80 per cent of the pressure is transmitted to the tube perhaps its overlying bar of cartilage absorbing the remaining 20 per cent As the nasopharyngeal pressure reaches 20 (or 50) mm Hg the effective excess pressure therefore rises to $\frac{20}{100} \times 20 \text{ (or } 50) = 4 \text{ (or } 10)$ mm Hg which is sufficient to overcome the resistance of the tube



Fig. 1 Left i
ou t i ouse l hut
l ll



Fx l M f l r ading
f l k f M the
f d
f l l l l
f x l l l l ou ol
tai l l l ll ds



f x l l l l l l l l
gh r ll l d ub
jec l l l l l f-lll -ar
pharyngal pr r k l

The Frenzel Manœuvre This was so named by Davison (1962) who drew attention to this variant of the Valsalva manœuvre which was described by Frentzel in 1938 Again the nose is held closed but this time the glottis is closed too and it is the muscles of the tongue pharynx and palate which by a trick movement bring about the rise in nasopharyngeal pressure The difference in mechanism is that a local rise in pressure around the Eustachian tube openings is combined with a degree of palatal muscular action which reduces the forces maintaining apposition of the mucosal surfaces in the outer two-thirds of the tube One would therefore expect a smaller nasopharyngeal pressure to be needed for ventilation of the middle ear by this method indeed 10 to 30 mm Hg has been found sufficient in this case compared with 20 to 50 mm Hg for the Valsalva method Apart from being a more natural method it has other advantages but for a discussion of these and a more detailed description of how to perform the manœuvre the reader is referred to Davison's review

Clinical Methods for Assessment of Eustachian Tube Function

The Valsalva test is rightly the principal method employed Its success as a clinical test with U S Navy submariners has been reviewed by Haines and Harris (1946) Their conclusion was that a positive test result did not automatically mean a man could cope with rapid pressurization With care though which involved using a slower rate of compression for some of the men otitic barotrauma was avoided However, when the Valsalva test result had been doubtful or sluggish unacceptably slow rates of compression were needed more frequently

Experience in the Royal Navy is similar as regards divers and submariners On the contrary for aviators there are grades of severity of exposure to pressure changes from minimal in helicopter flying to maximal in fixed-wing fighters Barring a permanent change in tubal anatomy it is unusual for anyone accepted on the basis of a positive Valsalva test later to become grounded from *all* types of flying on account of inadequate tubal function

The problem arises therefore in the "false negatives", that is in the 10 or 15 per cent of candidates whose Valsalva test results are negative but who very frequently can in fact clear their ears when under pressurization The way in which this diagnostic problem is overcome is described below

Refinements of the Valsalva Test

(i) Auscultation As with all diagnostic techniques this needs practice and experience of the method For this the ear-pieces of an old stethoscope joined together by rubber tubing can be used (Figs 1 and 2) The method is of very limited value but just occasionally one can hear the passage of air into the man's middle ear when there is no visible movement of his tympanic membrane

(ii) Subjective reactions If care is taken not to ask leading questions a considerable reliance can be placed on the man's description of "a sound of air moving" or "the ears" or of "pressure in the ears" The method is most useful in fact with trained aviators submariners and divers as they tend to use such minimal and momentary force in performing the Valsalva manœuvre that the movement of the membrane is missed In others there may be very firm tympanic membranes or the pressure change

in their middle ears may occur gradually, in these also the movement may be more difficult to see though the subject may give a good description of it

(iii) Correction of the subject's technique Every care must be taken to make sure that the expiratory effort is directed into the nasopharynx and is not restricted to the tracheo-bronchial system by contraction of the glottis or to the mouth by apposition of the soft palate and posterior pharyngeal wall or by mere puffing of the cheeks One way to ensure this is by sudden release of the nose a gush of expired air should result

A better method however is by nasopharyngomanometry The apparatus needed is shown in Fig 1 It consists of a sphygmomanometer connected by transfusion set adaptors and rubber tubing to a glass nose-piece fashioned from part of a transfusion giving-set (The side arm of the Y tube was intended for tympanomanometry but this has not proved to be very satisfactory or helpful and is now redundant) The subject is asked to repeat the Valsalva manœuvre but with the nose-piece being used to occlude one of the nostrils (Fig 2) The maximum nasopharyngeal pressure reached is then noted This varied from 60 to 180 mm Hg in the C A M B series of male subjects and from 30 to 100 mm Hg in a smaller series of females As already mentioned if a pressure in excess of 50 mm Hg is needed for a Valsalva test then the tubal resistance is probably abnormally high and the efficiency of tubal function is in considerable doubt

By means of such an apparatus the essentials of which are readily accessible to any medical officer a check can rapidly be made that sufficient pressure is being exerted in the correct place Frequently an apparently negative Valsalva test result becomes positive after one use of this training aid However it is worth while to ask the patient to note the pressure reached as he feels each ear inflate The subjective records are found to be in close agreement with objective measurements made either by auscultation as in Fig 2 where the nasopharyngeal pressure is being noted at the moment when the air movement is heard or by the more usual visual method In the latter case a clip (shown on the long tubing in Fig 1) is held open in the hand used by the observer to retract the subject's pinna (the left hand in Fig 3) and is released at the moment when the tympanic membrane is seen to move in response to the manœuvre The manometer is then read

This technique has further uses in dealing with the occasional malingerer If he is feigning a negative test result, a check that he is trying properly can be made even when the observer is apparently unable to see the manometer If he is feigning a positive test result but cannot demonstrate it in the ordinary way or is disclaiming a difficulty in clearing his ears that may have arisen in his training as an aviator then at least he can be asked to record the subjective pressure at which his ears clear, if he gives a value less than 20 the statement should be viewed with suspicion if it is over 50 then there probably is some tubal insufficiency

Toynbee Test If positive the ability to clear the ear on swallowing is proved In addition use of this manœuvre before a Valsalva test frequently makes the latter easier to see Likewise a positive but not clearly visualized Valsalva test may slightly increase the membrane movement associated with a subsequent Toynbee test

Alternate Toynbee manœuvres and Valsalva or Frentzel manœuvres can be used

to prevent delayed otitic barotrauma This condition is due to absorption of oxygen from the oxygen enriched air which exists in the middle ear following descent in an aircraft whilst breathing 100 per cent oxygen the normal practice in deck-landings A negative pressure begins to develop in the middle ear which will eventually lead to a serous effusion the mechanical causes of which have recently been reviewed (Coles 1963) Each Toynbee manœuvre sneks n little oxygen enriched air out of the middle ear the succeeding Valsalva manœuvre then forces normal air back into the middle ear By repeated manœuvres the excess oxygen in the middle ear can be gradually replaced by air which is normally absorbed through the middle ear mucosa but slowly

Appearance A lowered pressure in the middle ear causes retraction of the tympanic membrane This is seen as a foreshortening of the handle of the malleus and a diminution in the light reflex (the light reflected back by the antero-inferior part of the membrane which is exactly at right angles to the plane of incident otoscope light)

Reduced Mobility Retraction of the tympanic membrane also causes a reduction in its mobility which can be tested by use of bellows attached to the auriscope (Fig 1). Raising and lowering the pressure in the external meatus causes visible movement of the membrane, the normality of range of which can be judged by experience or can with better apparatus for tympanommanometry be measured

Testing the tympanic membrane mobility can also be a great help when one is not quite sure that the membrane moves in response to the Valsalva manœuvre The procedure is as follows

(i) Ask the subject to swallow The pressures on each side of the membrane should thereby be equalized and the membrane should reach its maximum mobility

(ii) If little movement is seen when the external meatus pressure is alternately raised and lowered check that the speculum is large enough to make an air-tight fit in the ear canal

(iii) Tell the patient to repeat the Valsalva manœuvre and continue to test his tympanic membrane mobility during this The temporary rise of pressure in the middle ear which results from a positive test can often be seen to cause a reduction in mobility even though the bulging outwards of the membrane cannot be seen with surety

Hearing If the audiogram is normal in the low and middle frequency range or any hearing loss is entirely of perceptive type then ventilation of the middle ear must be normal Blockage of the Eustachian tube leads to absorption of air and to retraction of the tympanic membrane tightening of the auditory ossicles and diminution of conduction of sound, i e to a conductive-type hearing loss

The reduction of sound transmission that occurs when a pressure differential exists across the tympanic membrane has been utilized as a means of measuring the middle ear pressure With the pneumophone subjective sensations of loudness of a pure tone are reported with an acoustic impedance meter changes in the resistance to sound transmission are objectively measured Maximum loudness or minimum resistance respectively occur when the pressure in the external ear is adjusted to equal that in the middle ear

History of Clearing Ears Even if the candidate has never flown before or is not

an underwater swimmer it is surprising how frequently a history of trouble-free pressurization can be found if his experience is searched. Cars in hilly country, trains in tunnels, underground trains and even lifts, e.g. in the Eiffel Tower or cable-cars in the Alps can provide the experience on which an observant man can give a useful history.

Swallowing Test. If an efficient pair of noise-excluding ear muffs are worn in an intense noise most people will notice that they get a burst of noise in their ears each time they swallow. This is due to passage of sound up the temporarily opened Eustachian tubes and it is being utilized at C.A.M.B. as a further adjunct to the diagnostic measures described above. The technique used is to place Mark 3 (fluid-seal) ear muffs over the ears and a Briarly noise box over the nose; the man then swallows and reports his sensations. A marked increase in the loudness of the sound is an indication of opening of one or both tubes in the act of swallowing. It appears to be reasonably reliable when positive, but a negative result is of no diagnostic value at all.

Acknowledgments

The author would like to thank all those who have helped in this study of Eustachian tube function, and in particular Wing Commander P. F. King, O.B.E., of the R.A.F. Central Medical Establishment in London, for his helpful discussion of the methods used by himself in examining candidates for R.A.F. aircrew.

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"SOLAR STILLS"

Condensed from "Current Survival Problems"

By Warrant Sub-Lieutenant H HARBOUR, R N

THE Solar Still has been the object of much attention by the Air Medical School during the past few years and the reports made have been the subject of much criticism

The attempt here is not to present too fine a detail of the reports made but rather to put them into perspective so that they may be viewed as a whole

Stills are presented to the survivor in a small polythene envelope For use, they are first removed from the envelope the drain cloth is thoroughly moistened to provide an air seal at the bottom of the still and are then inflated by hand bellows In the case of bellows supplied with the 20-man raft these fit on the inflation point but to the drainage tube with the smaller airerew bellows They may be inflated orally through either of the two points They should be inflated sufficiently hard as to cause a slight indentation of the retaining studs holding the inner black bag

Once inflated sea water is poured into the still through the funael at the top The larger part of the first filling passes down into the ballast tube at the bottom of the still thereafter a drip feed mechanism keeps the black bag continually moist Solar radiation passes through the outer polythene balloon but raises the surface temperature of the black bag by absorption causing evaporation of the sea water, which then condenses on the cooler inner surface of the polythene The fresh water forms as droplets which run to the bottom of the still through a water trap and into a collecting bag

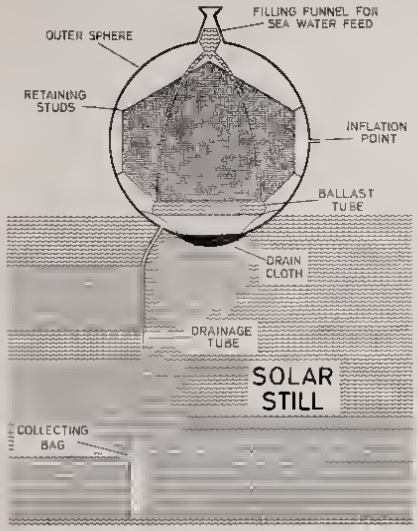
Theoretically one cannot fault the principle on which the stills work but all too frequently salty water is produced and widely varying results obtained The stills themselves appear at times to be temperamental but nothing can be attributed to manufacturing process which is carried out in excellent conditions and with a high standard of inspection

The Air Medical School was invited at the beginning of 1961 to examine and evaluate the then recently introduced Mark II still A small trial was undertaken to assess the amount of fresh water produced and subjectively the taste A reasonable quantity of water was produced, but of a brackish and unpleasant nature

A further small trial produced 3 oz of water in four hours but with a salt content of 1706 mgm per cent salt

In May of 1961 to complete the Atlantic Free Drift Trial 16 subjects were moored off Stokes Bay Pier to evaluate rations over a five day period The opportunity therefore presented to evaluate the solar still as used by the supposed survivor Fortunately the weather was sufficient to make the trial reasonably realistic and within an hour they were miserable and thoroughly sea sick Morale became very low, and at one stage it was thought the trial would have to be terminated In this apathetic state the subjects operated five stills during the first day None of these stills produced any drinkable water Two were heavily contaminated with salt but one had been allowed

to drift away from the raft during the night and this was lost to the raft During the night the stills became soft and by the morning were flat on the water and useless On the second day, the weather improved considerably to bright sunshine, little wind and calm water Because of the extremely low morale and as a replacement for a subject who had been removed an experienced Chief Petty Officer from the Safety Equipment and Survival Training School was put into the raft taking with him a further three solar stills With the improvement in the weather and under his influence morale rose and still operations began again, under his guidance It had been decided that no interference from the watchers on the shore would be allowed with regard to the stills The subjects therefore operated them as they saw fit and in three days of bright sunshine, produced water of an extremely high salt concentration, completely unfit to drink Subsequently some of the stills used were washed out and operated by the manufacturers and made to work satisfactorily



Clearly a more extensive trial was required and with the object six stills were operated later in 1961 Conditions are bound to vary with each trial if only because of the vagaries of the British climate One therefore cannot exactly repeat any conditions and one tends to wait for a nice sunny period if only to give the stills a fair chance Perhaps of all the trials weatherwise this was the best The day temperature was often in the seventies with long periods of bright sunshine while the sea state remained smooth

The six stills were split into two groups one group to be drained manually each hour to determine the rate of product and salt contamination if any The second group as a control was left to drain naturally Manual drainage is a tricky operation if not carried out with extreme care but with the very fine sea state this was carried out successfully

Some stills produced good quantities of water with an extremely low salt content during this trial (168 c.c.—18 mgm per cent NaCl in an hour as an example) but some salty products were also obtained

An attempt was made to estimate the optimal internal air pressure required and stills were therefore operated at a variety of pressures Although visually all the stills appeared to be working satisfactorily on one occasion only did a still left to drain naturally pass its product into the collecting bag This was when operated at as high an air pressure as it would hold but poor volumes were being obtained

No definite conclusions could be drawn from these observations on the internal air pressure apart from the one occasion when at high pressure the still drained naturally It appeared however that raising the internal pressure caused a lowering in the volume of the product

It was concluded that no reliance could be placed on a still working, although it was agreed that extremely good results could be obtained Following the criticism of this report a further trial was undertaken early in 1962 A requirement for this trial was that the operator should not have handled a solar still before

This new series of trials therefore began with a completely inexperienced operator With six solar stills he found three different sets of instructions but with a compromise between the three he settled down into working At the end of his trial being quite satisfied with the results obtained, he was horrified to have his trial completely rejected by a representative of the manufacturers who maintained his stills were incorrectly operated by being under inflated His argument that the instructions appeared so ambiguous as to be meaningless, had borne fruit He pointed out that although some of his results were good some salty water was still obtained and he queried the amount of fresh water produced as not being worth while for the effort involved

Because of his misinterpretation of the instructions the trial was extended with the stills being operated on a new set of instructions formulated in the Air Medical School—and using the top filling funnel as a water manometer The results of this extension showed that at best no worsening of the total product occurred and indicated that given favourable conditions, better results might be obtained It was observed however that the material used in the construction of the collecting bags of the Mark II still appeared fragile and soon split in the cold water

An interesting side trial developed at this time. This was to determine what level of salt might be detected by survivors. A series of salt solutions were prepared and subjects were invited to state which they would accept as fresh water from a solar still. The results showed that some 80 per cent would accept normal saline a concentration probably three times greater than should be accepted.

These "new" instructions were taken a stage further by an assessment under tropical conditions but here the difference between the Mark I and Mark II solar stills became apparent. Operated under a high-pressure technique with high temperature over a sustained period both types of still simply grew and grew. With the Mark I this was sufficient to cause a stoppage of the sea water drip feed, with subsequent drying out of the black bag so the still no longer worked and if left the breakage of the retaining struts holding the black bag in position causing it to collapse either way the result was a useless still. The Mark II appeared to be less affected by the high pressure and high temperature. If left the black bag dried out but the struts did not break and if deflated and left they gradually began to work again.

One point with Mark II stills was the material became so soft and pliable that the top filling funnels collapsed spilling the contents. This probably affected the internal air pressure.

The results of the Aden trial showed that a high-pressure technique could not be used in this type of climate and for the length of sunshine each day the volumes of fresh water produced were very poor. Without close supervision the stills could very easily cease to function. This supervision was such that two experienced operators spent three quarters of every hour attending 18 stills.

The series of trials terminated with eight Royal Marines, inexperienced with the still operating both Marks I and II from moored liferafts. Poor yields were again obtained and some unacceptably high salt content water was produced however it appeared that without adequate supervision survivors would not follow operating instructions too rigidly.

From all trials carried out during 1961 it appears that at best with six solar stills working 20 survivors in a liferaft could expect a return of 2 oz. each a day. This does not allow for those stills which fail to perform satisfactorily nor for those damaged or lost to the raft by carelessness or misfortune.

It would seem that some experience is necessary in their handling plus a certain amount of luck.

The Royal Air Force do not agree with the results obtained by R.N. Air Medical School and are themselves quite happy with the still and its product. However, a fair criticism of the Royal Air Force is that their potential survivors—aircrew—are trained in the handling of a still during courses. It is doubtful if more than cursory training could be given to the much larger numbers of potential naval survivors. Joint Royal Navy and Royal Air Force trials are envisaged for the future to determine at what point operating stills differ.

Articles

EARLY OAYS AT THE ROYAL HOSPITAL, PLYMOUTH

Being further extracts from The Private Minntes and Memoranda kept by Captain Richard Creyke Royal Navy

By Captain T P GILLESPIE, R N

In the churchyard of St George s Church Stonehouse there once stood a stone with the following inscription

> ' Richard Crevke for 31 years Governor of the Royal Naval Hospital and Commissioner of the Victualling Office Plymouth who died December 4th 1826 in his 81st year'

Thus was marked the final resting place of Captain Richard Creyke Royal Navy who had so much to do with the early history of the Royal Naval Hospital Stonehouse or to give it is original name—the Royal Hospital at Plymouth The stone may still have been there in 1958 bnt the church was bombed during World War II and the graveyard was in snch a state that a search in 1959 was abortive The graveyard has now been cleared for an industrial site and the resting place of Richard Crevke is lost for ever

It was in Jnne, 1757 that nbont 25 acres of land in Stonehouse was purchased from Lord Mount Edgeumbe and plans were drawn np for the construction of a hospital The actnal building was started in 1758 and the first patients were received in 1760 the buildings were finished in 1762

It is nntortunate that the early records of the hospital are incomplete but there still exists a letter book, nnmbered 4/6 which contains copies of letters written by the Steward and Agent to the Commissioners for Sick and Hurt Seamen between the years March, 1767 and May 1774 This letter book is a mine of information on the day to-day administration of the hospital and provides plenty of evidence that all did not rnn smoothly in the early days Towards the end of the period covered by the book it is quite clear that a state of what might be called open warfare existed between Mr Samuel Holman the Steward and Mr Lott, the Agent the latter having made in Mr Holman s words 'a vagus and invidiary representation and in most instances false and scandalous complaint against him in connection with the payments to tradesmen and the servants of the hospital In Mr Holman s words

> I defy him to prove a single instance either by a tradesman or servant of the hospital where either one or the other have at any time murmured at my condnct abont their money being unjnstly or negligently detained from them

Mr Lott made various other charges and it is more than likely that there was fault on both sides It may be that this nnpleasantness was among those which led the Admiralty to enquire into the state of the Naval Hospitals not only at Plymouth but

Haslar Hospital as a result of which an Order in Council dated 3rd July 1795 was issued which stated *inter alia*

> having had under our consideration the state of the Royal Hospitals at Haslar and Plymouth and also the report made to Admiral Lord Howe by the Admirals Gardner and Caldwell assisted by Captains Nicholls and Domett of their observations we are of humble opinion that the forming of some new Establishment consisting of a certain number of officers of Your Majesty's Navy for the purpose of superintending the interior arrangement and economy of the said hospitals would be a measure highly advantageous to Your Majesty's Service not only by ensuring a proper attention to the sick but by preventing in the most effectual manner the inconveniences which have frequently been felt from a want of proper discipline and subordination in the said hospitals We therefore most humbly propose that Your Majesty will be graciously pleased to authorize (the appointment of) such officers as may be found to be sufficient for the execution of the duties mentioned the extent of the Establishment at each Hospital not to exceed one officer of the rank of Post Captain and three Lieutenants

Captain Creyke received his commission as Governor of the Royal Hospital on 4th August 1795 and started his Journal on the same day He was presented to the King on his appointment and received his instructions from the Admiralty on 20th August and from the Commissioners for Sick and Hurt Seamen on the 24th He reached Plymouth on the evening of 27th August and took up his appointment the next day

On arrival he found that the two lieutenants—Rose and Williamson—had already arrived and he immediately 'made a complete survey of the several wards and buildings of the hospital found everything as far as I could judge from inspection and the reports of the respective officers in perfect good order' However everything did not measure up to his standards and within two days there is the entry 'Gave an order to the Physician, Surgeon and other officers to attend Divine Service and to cause their Assistants to attend also" This was apparently his first order and is closely followed by the entry on 31st August 'Wrote to the Commissioners about erecting pews in the Chapel for the Governor and Lieutenants'

He then started to enquire into the various goings on in the Hospital among them the supply of fruit etc to the patients The entry for 1st September includes the following

> "I find that it has been the custom of the Porter to admit women with fruit and gingerbread for an hour or two in the morning to sell to the Patients I've confirmed the permission, thinking that it cannot be prejudicial to the recovery of the sick to obtain a small supply of ripe fruit I find that among the necessaries supplied by the liberality of the Government to the patients of this Hospital are wine porter, tea, cocoa, sugar, lemons and oranges—this has only obtained in such abundant supply since the 1st June 1794 when it was asked for by Lord Howe and has been since continued The expense of these articles has no limit but the discretion of the Medical Gentlemen who order and the Dispenser supplies whatever quantity is demanded Thus in my opinion

> though exceedingly proper if kept within just bounds is so liable to abuse that there should be some efficient controls to remove the possibility of wasteful or improper expenditure of such valuable articles

Shortly after this date Captain Creyke arranged that every demand from the Dispenser for these articles should receive his approval before supply was made by the Steward and Agent. Towards the end of December, 1796 he made a point of noting in his Journal details of the numbers entitled to receive wine and porter and the actual amounts issued every week.

It is perhaps not out of place to mention that all did not go well with the supply of porter during the period of the Journal On 30th December 1796 there is an entry

> Received a complaint of the porter being so bad as to be scarce drinkable Enquired into the complaint and find that the porter is of an inferior quality but as it is also of inferior price, there is no remedy but in a new contract Things however seem to have drifted on for a bit as it was not until 17th December 1798 that some definite step was taken
>
> Approved and recommended to the consideration of the Board a representation from the Steward and Agent of the preferable quality of the London porter over that of the present contract porter and requesting a supply of the former article

No action appears to have been taken on this recommendation until early in September 1799 when the Sick and Wounded Board wrote to the Physicians and Surgeons to "be informed what has occasioned so great a consumption of wine at this Hospital as it far exceeds the expenditure they have ever known at any other hospital This presented the hospital authorities with another opportunity to attempt an improvement in the quality of the porter supplied The enquiry was answered by stating their opinion that much less wine would be prescribed if the porter supplied was of better quality '

Things began to move and after a mere two weeks the Board wrote to say that The porter to be used in this hospital will in future be supplied from London by Messrs Meux and Co and desiring to know in what kind of casks it will be most convenient to have it supplied ' The first supply from Meux & Co consisted of 40 barrels and was despatched from London on 30th September 1799

It is a pity that there are no entries in the Journal giving information on whether or not the change in porter resulted in an improvement in the health of the patients

To go back to the time of Captain Creyke's arrival at the hospital the Journal then includes a detailed description of the hospital as follows

> The hospital has accommodation for 1,250 patients there are five large square buildings on each side of the quadrangle each containing six wards and each ward was originally intended to hold 25 cradles, but it was inconvenient to crowd so many together and they have been reduced to 20 1 200 are thus accommodated in the 60 wards and there are two cellars under the Building No 8 which have been fitted up and occasionally used for the reception of men in slight cases these two places will hold 25 each, which makes up the total number of 1 250 Besides these buildings there are on each side two smaller pavilions the first on the right hand is the Labourers Ward and Victualling

Rooms over which are four solitary cells intended for the confinement of Insane and Maniacal patients and the other contains the Dining Hall and Cook Room The first on the left hand is the Steward s Store Room and the other is the Small Pox and Recovery Small Pox Wards Under the different buildings on the right hand side (exclusive of the two cellars above mentioned) are the Beer Cellar Coal Cellar, the Mason s and Carpenter s Workshops The Chapel Building in the centre contains on the ground floor the Dispensary Dispensary Storeroom and Dispenser s private appartments on the first floor the Chapel Council Room Dispenser s Assistants and Matron s appartments On the upper floor the Cook s and Plumber s rooms the Matron's store room and flock room In the outer division of the hospital's grounds are the houses and gardens of the Physician Surgeon Steward and Agent behind them are the houses of the Steward s Clerk and Agent's Clerk and the Wash House and also the bedding house within the 2nd gate are on the left hand the Porter's Lodge and the Agent s Office and the Receiving and Fumigating Rooms On the right hand the Butler s rooms and the Steward s Office and further on the Fire Engine House commonly called the Dead House because corpses are removed there from the wards in order to interment adjoining are the Dispenser s and Minister s stables Besides these buildings there are the Engine House for forcing water up to the top of the different buildings to supply the wards and the reservoir for furnishing a back water to cleanse the common sewers '

Captain Creyke did not long leave the buildings in the hospital in the state he found them on 8th September 1795 he wrote to the Secretary of the Admiralty about a residence for himself and also forwarded an estimate for "erecting a Necessary for the Governor " The place he selected for the latter was too much for Dr Farr the Physician—" in consequence of a representation from Dr Farr that the proposed Necessary will be a blemish to the eye in coming up the middle walk and also to the adjoining Dispensary I have directed it to be built on the outside of the Small-pox Ward, where no eye but that which searches for it can discover it"

Next in November of the same year there was trouble with the water wheel which supplied water to the buildings of the hospital An estimate was prepared by the Surveyor for the renewal of the wheel amounting to £60 2s and this was forwarded to the S & H Board who in due course approved the proposal and the work was then put in hand.

And so on throughout the Journal the day-to-day repairs and alterations to the Royal Hospital are listed, details of the estimate of the costs inserted, and finally there is in most cases an entry to the effect that the necessary repairs, alterations, etc have been approved and put in hand

There were also differences of opinion with the local inhabitants of Stonehouse, which had to be looked into and ironed out In November 1796, Creyke heard that there were plans to build on the land adjoining the Hospital Gate and came to the conclusion that this scheme would be "a great inconvenience and obstruction to the approach of the Hospital " He therefore collected all the information he could and informed the Admiralty of what was going on In due course the Admiralty replied in the following terms 'Their Lordships do not think it proper to purchase the piece

of ground in Front of the Hospital Gate but desire me to explain to Mrs Croad the Proprietor Their Lordships wish that she will desist from building on the premises One wonders what effect such a wish would have today

On 28th June 1798 there appears the following entry

> Mr Perlby and several of the inhabitants of Stonehouse came to me with a representation of the insufficiency of the supply of water to the inhabitants of the town from the leet which passes thro and supplies the Hospital and requesting that no obstruction to the passage of water may be permitted I assured them that strict orders had been given by me from time to time for the preservation of the water of the leet for the benefit of the inhabitants of Stonehouse and that I apprehended that it was tly owing to the dryness of the season and partly to the leets being carried thro gardeners grounds intervening between the hospital and the shoot in Edgcumbe Street and it appearing to the Committee that this was the cause of the deficiency they left me with a declared intention of causing a brick channel to be made for conveying the water from the hospital across the gardens to the shoot in Edgcumbe Street and a Reservoir and Conduit to be constructed to prevent waste of the water

From the entries through the period of the Journal it can be fairly stated that its business between the Hospital and the people of Stonehouse was carried out in a helpful and friendly manner on both sides

When Captain Creyke took up his appointment the hospital was controlled by The Physician and Council which consisted of the Physician the Surgeon the Steward and the Agent After his arrival this became the Governor and Council ' but as might have been expected things did not go too smoothly and there are a number of entries in the Journal referring to differences of opinion between the Governor and the various members of the Council as to the manner in which certain things should or should not be done A particular point was whether reports from the Physician and Surgeon should be addressed direct to the Admiralty as had been the custom in the past or to the Governor as Creyke thought was now the correct channel of correspondence These difficulties were finally resolved on 16th June 1796 when a letter was received from the Sick and Wounded Board enclosing an extract from a communication from the Secretary of the Admiralty dated 10th June directing them to inform me of Their Lordships determination to abolish the Council at Plymouth and Haslar and that all matters not relating to the chirurgical or medical treatment of the patients shall in future be transacted thro the respective Governors of the said Hospitals ' But this order did not solve all disagreements for on 18th June we find Governor Creyke directing 'an order to the Physician Surgeon Steward and Agent to deliver into my care and custody all paper whether orders regulations or correspondence which in any way relate to the government of the Hospital and which have since the first establishment been addressed to or by them in their collective capacity as Physician and Council for carrying into effect the regulation and discipline of the Hospital '

This was a pretty all-embracing direction and as might have been expected met with a refusal from the officers to whom it was addressed on the grounds that their papers were so blended with matter that concerned them in their respective offices

that they would thereby be deprived of what was necessary for their guidance and instruction and moreover they think that they ought to have the previous sanction of the S. & W. Board.

Creyke seems to have had second thoughts on the matter and perhaps appreciated that his previous order had gone a little too far for the matter appears to have been let drop.

Thereafter probably due to the good sense of all concerned things can be said to have worked on the whole smoothly and there are few if any traces of friction between the senior members of the hospital which merited an entry in the private Journal of the Governor.

But difficulties with the senior members of the staff were not the only ones with which Captain Creyke had to deal. On 25th May 1796 he refused to sign a letter to the Board requesting a relief for a Mr. McKay (an Assistant Dispenser) who had been discharged at his own request the grounds for refusal being that McKay should have applied through the Governor. Creyke writes: "I then suggested an alteration to be made in the letter viz. that he discharged and absented himself without my knowledge and consent. This intention on the part of the Governor drew from the Medical Assistants "a very improper and impertinent remonstrance which on questioning them being avowed I informed them it should be laid before the Admiralty and the S. & W. Board with my letter of complaint of their resistance to my authority."

The Admiralty must have replied by return of post for on 1st June there appears "a letter to me informing me that they had received my letter of 25th enclosing a copy of the letter addressed to me by the Medical Assistants of the Hospital and had in consequence addressed a letter (enclosed) reprehending these Gentlemen's improper and petulant behaviour and threatening them with immediate dismission (sic) from their employment if it should ever come to the knowledge of the Board that they had shown any insolence or disrespect to the Governor or presumed to call his authority in question." The Admiralty was clearly on Creyke's side. Later the Assistants were called before the Council but, "showed no signs of sorrow for their improper conduct." However the matter seems to have died down and there is little doubt that the firm action taken by Captain Creyke on this and other occasions when his authority appeared to be questioned did much to get the reorganization of the hospital off to a good start.

A brief note on the state of discipline in the hospital has already appeared in this Journal (Vol. XLV. No. 2. Spring, 1959) and it is not proposed to remark further on this point other than to say that the examples in the Journal clearly show that Captain Creyke was a just and humane man who never punished without due thought who was always ready to accept an apology and who fully realized that no more severity should be resorted to than was necessary for the prevention of offences and the maintenance of a proper standard of discipline.

The Journal which covers the period 4th August, 1795 to 31st October, 1799 consists of 138 double sided pages each measuring $9\frac{1}{2}$" by $14\frac{1}{8}$" and was written up daily. It contains a mass of detail connected with the day-to-day running of the hospital and also about the general administration of the Plymouth Command as far as it affected the hospital. The Journal deserves to be published in greater detail

th in this art cle permits and the notes that follow merely give a small indicatio of the varied information contained therein

Religious Ministration

A Chaplain was allowed in the scheme of complement and his instructions included the fact that in his absence he was to procure some person in Holy Orders who shall be approved of by the Governor to perform duty for you during your absence Divine Service was to be performed twice daily on Sundays and also on Christmas Day Good Friday and all days appointed for public feast and thanksgiving With certain exceptions sermons were required in the morning only and the Chaplain was enjoined to be careful to adapt his discourses and instructions to the capacity of the generality of his congregation in order that they might be intelligible to all who heard him It is of interest to note that in September 1797 his salary was increased to £100 a year with the addition of 1s on every occasion of performing the Burial Service

Books of a religious nature were also distributed from time to time

"2nd July, 1796 Received 20 bibles and 10 small books Of the importance of a Religious Life' from the Bible Society which I have distributed into the Wards entrusting them to the care of the Nurses for the use of the patients "

"12th March 1797 Received from the Society for promoting Xtian (*sic*) Knowledge 25 Bibles 60 Prayer Books 60 Meditations and Prayers 50 Friendly Advice etc 200 Seamen's Monitors—distributed a proportionate number to each ward

Greenwich Hospital

The good work of Greenwich Hospital comes in for mention from time to time and the following extract is typical

"3rd April 1797 Directed Andrew Buchanan Cook of the BELLEROPHON to be discharged into the CAMBRIDGE being incapable of receiving further relief from the hospital Wrote to request the Port Admiral would give him leave to go to town and recommend him to Their Lordships as an old worn-out servant of the public and deserving of a retreat in Greenwich Hospital "

Mutinies

Mention is also made of various Naval mutinies

"25th May 1797 This day the Mutiny ceased in the ships in the harbour and the King's Pardon was read to the Companies of the respective ships and they were declared to be again in due order and subordination—no symptoms of mutiny appeared among the patients in the hospital

11th December 1797 At the request of the Port Admiral gave directions that 2 coffins shall be sent tomorrow morning at 8 o'clock to receive the bodies of the 2 mutineers who are ordered to be executed onboard the MARLBOROUGH in Plymouth Sound

"19th March 1798 Directed coffins to be supplied for the corpses of the two men who were hung this day for mutiny onboard H M S AMELIA"

"29th August, 1798 Ordered (at the desire of the Port Admiral) six coffins to

be supplied to receive the bodies of six mutineers who are to be executed to morrow onboard their proper ship the CAESAR in Cawsand Bay

"26th October 1795 Ordered 8 coffins to be prepared to receive the bodies of 8 mutineers of the GLORY ordered to be executed tomorrow"

The Loss of H M S AMPHION

On 22nd September 1796 the frigate AMPHION who had put into Plymouth for repairs blew up while alongside a sheer hulk taking in her bowsprit Being about to sail the ship was crowded with visitors and the loss of life was some 300 of the 312 or more onboard Not unnaturally this incident involved the Hospital and figures in the Journal

"Received a report from the Lieutenant of the Day that the Boatswain and four others belonging to H M Ship AMPHION had been brought to the Hospital wounded and much hurt by the dreadful accident of the ship being set on fire and blown up alongside the sheer hulk in the Hamoaze 35 dead bodies were brought in the evening to the hospital for burial, there is much reason to fear that not more than 20 were saved out of the number onboard at the time of this melancholy accident . . the Third Lieutenant of the ship Lieutenant of Marines Surgeon and most of the Warrant Officers and mid shipmen perished in the explosion together with many women and visitors from the shore

The next day Captain Creyke remarks

A woman being brought into the hospital much hurt by the blowing up of the AMPHION was from motives of humanity received and sent into a ward by the Assistant Surgeon attending at the receiving room and from the same motive directed by me to be entered as a Nurse and sent into the sick Nurses' Ward '

Still later on 29th September, there is the following entry

"Dr Farr having represented to me in strong terms the danger of receiving any more corpses from the AMPHION in the state of putridity which they must be, I have directed the Agent to refuse admittance to any more and in order that proper means may be adopted for their interment elsewhere I have reported my proceedings to the Port Admiral and Commissioner"

However this was not the end of the matter and on 4th October Captain Creyke writes

'In consequence of representations made to me of the indecent neglect of burying the corpses floating about the harbour I have with the concurrence of the Port Admiral directed that the bodies shall be received at the Jetty there put into coffins and from thence be conveyed as soon as convenient to the Hospital burying ground

These arrangements must have been satisfactory since there are no more entries relative to the loss of the AMPHION except for one on 8th May 1797 reporting two more bodies being received for burial

The cause of the explosion has never been ascertained one suggestion put forward at the time, was that the Gunner had spilled some powder near the fore magazine,

and that this ignited accidentally with the result that the magazine itself caught fire In support of this idea it was alleged that the Gunner had been suspected of stealing the powder and on the day in question is said to have been intoxicated and was probably less careful than usual —however he was among the 300 who lost their lives

Highdays and Holidays

The general progress of the war did not pass the Hospital by but was suitably celebrated

16th October 1797 "Directed the Hospital Gate to be illuminated on account of Admiral Duncan's victory over the Dutch on the 11th instant"

4th October 1798 Ordered the Hospital Gates to be illuminated in honour of Sir H Nelson's glorious victory over the French Squadron at the mouth of the Nile on August the 1st and 2nd

29th November 1798 Being the day appointed for a General Thanksgiving for the recent victories of H M Fleets attended Divine Service in the Hospital Chapel

Changes of Command at Plymouth

Note is made of the various changes in command at Plymouth

27th January, 1796 "Vice Admiral Onslow took command of the Port

It is of interest that the record boards at Admiralty House Plymouth do not record Admiral Onslow as being in command but show Admiral Sir Richard King from 1794 to 1799 Ralfe's "Naval Biography" probably provides the answer in the following extract

> " in March 1796 he (Admiral Onslow) was nominated to the chief command at Plymouth, but his abilities being properly estimated this situation was considered too inactive for him at such a season of hostilities and he was accordingly ordered to hoist his flag onboard the MONARCH of 74 guns and to join the fleet under Admiral Duncan as second in command

11th April 1799 "Sir Thos Paisley Vice Admiral of the Red, succeeded this day to the command of the Port Vice Sir R King resigned"

Inspections of Ships

From time to time the Physicians were instructed to inspect the medical arrangements in ships Some of these occasions are as follows

20th March 1796 "a letter to the Governor and Council to enquire into the truth of a report sent up from Vice Admiral Onslow to the Admiralty of a contagious disorder having been introduced into the Hospital by some men sent from the SERPENT and requiring the utmost caution in the treatment of these men on making strict enquiry into the truth of this report I find it unfounded in every particular"

One finds it hard to understand at the present time how it came about that Admiral Ouslow who was Port Admiral came to make a report to the Admiralty without first checking its accuracy with the Governor of the Hospital

29th July, 1796 Received an enclosure from the S&W Bd requiring Dr Farr to visit the JASON on her arrival at Plymouth as she is said to have an infectious

disorder onboard and to direct the proper method of fumigating her and to cause the sick received from her to be kept in a separate ward and proper precautions taken to prevent communication with the other patients and to report the state of the sick to the Board"

17th May 1799 "Received an enclosed direction from the S&W Bd to the Physician of the Hospital to visit the SATURN and report on the state of her sick and the measures that have been taken to prevent the supposed infection spreading"

In this case it would seem to have been a fairly virulent infection for on 13th June there is an entry reporting that 86 of the SATURN's men were still in hospital

Foreigners serving in the Navy

Occasionally enquiries were received from the Admiralty or through the Port Admiral as to the position of certain men serving in the Navy who claimed to be of foreign nationality. Most of the enquiries related to men claiming to be of American, Danish or Swedish citizenship. It is a pity that names are rarely mentioned: examples are given below

31st July 1797 "Received a request from Sir R. King the Port Admiral for a report on the case of John Lock a patient in the Hospital, said to be an American"

15th August, 1798 "Received from the Port Admiral a request that L. C. Holt may be discharged provided he produces proof of his being a Danish subject. Answered that on examination Holt produces no document to shew that he is actually a Dane and therefore refer it to the Admiral to determine whether in such circumstances he shall be discharged"

12th February 1799 "A man claiming to be a Dane was ordered to be discharged "as his tongue and his own assertion show him to be a foreigner altho' he had no documents to produce

22nd September 1799 "Received through the Port Admiral Their Lordships' directions to report the case of Jn. Allen claiming to be an American citizen—answered that he was discharged to 20th inst. to the NYMPHE"

Guard at the Hospital Gate

A guard was provided at the Hospital Gate to control entry and exit and also to prevent desertion. Sentinels apprehending deserters were entitled to a reward and there are a number of entries in the Journal relating to such payments. Until June 1798 the Guard was provided from the Royal Marines, but thereafter the duty was carried out by the Royal Invalides: the following extracts from the Journal refer

13th June, 1798 "Received notice from Major General Bowater that from want of men the Marine Corps can not at present furnish the Guard at the Royal Hospital"

14th June, 1798 "The Hospital Guard was taken this morning by the Royal Invalids instead of the Marines"

Later, of course, the Guard at the Hospital Gate was provided by the Metropolitan Police, who remained there until 30th June, 1927

Enquiries from Members of Parliament

Somewhat surprisingly there is only one entry recording the receipt of an enquiry from a Member of Parliament, as follows

30th June 1798 "Received and answered a letter from Mr Chas Dundas MP relative to a patient in the hospital

Inoculations

Inoculations were at times carried out in the Hospital though not without misgivings

9th September 1798 "...a letter from the S & W Bd enclosing a copy of a letter from Mr Nepean directing that such men of the CAPTAIN as chuse to be innoculated may be received into the Hospital for that purpose"

15th September 1798 "Received and transmitted to the S & W Bd a representation from the Physicians and Surgeons of the danger and inconvenience of receiving men into the Hospital for innoculation

Governor's Inspection

Captain Creyke made regular visits to the Wards and recorded the state of what he found in his Journal examples are as follows

9th November 1798 "Visited and examined the state of the Wards open in the Hospital found them all in perfect good order the patients well attended and treated with due care and tenderness"

3rd April 1799 Visited all the Wards open in the Hospital and found them in good order but as the patients complained of suffering from the severity of the cold I have ordered an addition of ½ of a bushel of coals whenever it is recommended by the Physicians and Surgeons"

Misconduct by Officers

It is sad to recall that there are a number of entries relating to misconduct on the part of officer patients in the hospital Captain Creyke dealt with these firmly and at once but he was not averse to showing mercy where mercy was justified

14th January 1799 Informed Mr Nepean as directed by my instructions of the improper conduct of Mr R W Allen late of the THISBE who exceeded his leave yesterday and returned much intoxicated and abused the Porter in a gross and scandalous manner and has this day absented himself from the hospital without leave

17th January 1799 "Ordered Mr Allen invalided from the NEPTUNE to be discharged for irregularity"

20th January 1799 "Received from Mr Nepean a letter informing me that Their Lordships have ordered Lieutenant R W Allen to be struck off the List of Lieutenants in consequence of his misconduct whilst a patient in this Hospital

12th November 1795 "Four officers (patients in the Hospital) who had obtained leave in my absence to pass the gate for a few hours did not return till between 12 and one this morning when the Serjeant of the Guard very properly refused them admittance They came in at eleven this forenoon When I sent for them and represented the extreme impropriety of their behaviour of which they neither seemed sensible nor inclined to apologise I resolved to report their contuminous conduct to the Port Admiral whilst I was writing the letter Lieutenant Hayter brought an apology on their parts and promise of regularity in future Wishing rather to excuse than censure I destroyed the letter and signified it to them

12th October 1798 'Received a letter from Mr Nepean to inform me that at the request of Major General James Their Lordships have forgiven Lieutenant Earle Harwood of the Chatham Division of Marines for having absented himself from the Private Quarters of this Hospital and ordered him to be severely reprimanded by the General '

26th November 1795 "Received a report that Mr Gough has this morning returned after exceeding his leave two days—sent for and severely reprimanded him—his appearance of contrition and the reflection that a complaint of his conduct to the Admiralty would for ever ruin him in the Service has inclined me to this milder mode of reprehending him"

The strange case of Lieutenant Ayres

The following entries refer to the case of Lieutenant Ayres of the CHARON It is an unfinished story and one wonders what exactly the truth was

21st May, 1798 "Approved the discharge of Lieutenant Ayres (late of the CHARON) from Private Quarters cured and informed Mr Nepean of his discharge and residence

27th May 1798 'Received a letter from Mr Nepean informing me that Mr Ayres late of the CHARON is not a Lieutenant altho' sent to the Hospital as such

28th May 1798 "Wrote to Mr Nepean to justify the officers of the Hospital for receiving Mr Ayres being called 2nd Lieutenant of the CHARON on the Sick Ticket sent with him to the Hospital."

Miscellaneous

There are a number of entries which unfortunately tell only part of the story or give a line on some happening about which it would be interesting to know more Examples are

2nd July 1797 "Received from Mr Lambert, Magistrate at Edenderry in Ireland a request that I would take the disposition on oath of one Frederick O Neal Marine and a patient in the Royal Hospital relative to the plans and proceedings of the Defenders in the part of Ireland but finding on enquiry that the man had been discharged to Headquarters I have referred the business to Major General Bowater"

2nd June 1798 ' Ordered Nurse Brown to be discharged for assisting a patient in counterfeiting a disorder with a view of being invalided and confined Geo Mason a patient for like practices on the evidence of Andrew Gavin whom I immediately discharged to screen him from the resentment of the detected imposters"

9th August 1798 "Received from Mr Nepean Their Lordships' directions to discharge Thos Byrnes a deserter from the 20th Regiment sent hither from the POMPEE now claimed by the Adjutant General of the Army Caused the Books to be examined but find no such name there '

10th November 1798 Wrote to Captain Newman of H M Ship MERMAID relative to a quantity of powder found in the chest of the Gunner of that ship a patient in the hospital

14th December 1798 "Ordered some men and women burnt by the explosion whe the COQUILLE French Prize blew up to be received on the emergency in the Hospital"

30th January 1799 "At the desire of Sir R King directed a boy (patient) to be discharged into the CAMBRIDGE having been improperly pressed into a Bristol tender"

7th May 1799 'Received from the Mayor of Plymouth a resolution of the Grand Jury of that Borough thanking the Governor Officers and labourers of this Hospital for the services done by the Hospital engines in extinguishing a dreadful fire on Wednesday evening last (i e 1st May)

At the end of April 1797 Captain Creyke had not been too happy about the state of the fire engines in the hospital and had ordered the fire engines to be tried and exercised by the labourers and enforced the standing order for this service being done regularly once a quarter' His foresight obviously paid off here

10th August 1799 "Directed permission and assistance to be given to Mr Slater King's Messenger in searching for Andrew Stafford charged with divers robberies and murders in Ireland and supposed to be in this Hospital

12th October 1799 "Ordered two of the Carpenters to be turned out of the Hospital never to be admitted again for bringing in and selling liquor to the patients

One last example—a sad entry

7th October 1799 "Mr Baylis who has worthily filled the Office of Inner Porter at this Hospital for 39 years died last night"

What stories he could have told and what changes he must have seen during his service!

Conclusion

From the entries in the Journal a picture of Captain Creyke emerges—he undoubtedly was an honest and upright man with a strong sense of right and wrong and inclined to be most meticulous He was in no way a harsh man though he was a strict disciplinarian and stood no nonsense from those under his command The punishments he awarded were never ill-considered and showed that he realised to the full the wisdom of tempering justice with mercy If there was a genuine doubt, he was the first to give the benefit of it to the accused and genuine repentance and sorrow were always given due weight.

It is a great pity that only one volume of his Journal has been found—he was not the kind of man to give up without any apparent reason a task he had kept going for over four years It may be that the other Journals have been destroyed—or perhaps they are languishing in some trunk or box of documents—but if ever they come to light there is no doubt that they will prove to be as interesting and as valuable as a source of information on the early days of the Royal Hospital as has the one volume that has apparently survived

PRESENT THOUGHT ON THE MANAGEMENT OF IRRADIATION CASUALTIES

By Surgeon Lieutenant-Commander T. L. FALLOWFIELD, R.N.

The requirements for the ideal treatment of persons injured by radiation are such that the discussion of these must be limited to the preparations for the receipt of casualties arising from a localized accident, for example one involving a reactor. In this case one is immediately faced with the problem that there has not been a sufficient number of accidents to allow reasonable prediction of the number of persons likely to be involved and the dose range which might be encountered.

If an incident such as an accidental reactor excursion is considered the presenting situation is one in which it is known that a high radiation flux has been released by virtue of the reactor alarm system, but there is no way of telling at that time who, out of the large number of people who may be present, has received a potentially harmful dose of radiation. The first requirement is therefore an initial sorting on the basis of dose estimation. This can be carried out quickly and easily with regard to the neutron dose by measuring the activity of the indium foil carried by all radiation workers.

Classification by this method would in the first instance be fairly rough into high, medium and low dose groups. The division between the groups is entirely arbitrary, but realistic figures might be over 100 rem for the high dose group and less than 25 rem for the low dose group. Explanation of the situation would be the only action necessary for the low dose group, while continued observation of the medium dose group would be required and reassurance would certainly be important to both. The remaining, much smaller number in the high dose group would have to be evaluated by detailed investigation, necessitating admission to the medical department at the site. It follows that there should, in any situation where an accident is possible, be a medical department with the accommodation and facilities for this work.

The evaluation of each case is dependent upon the estimates of the radiation dose received together with the observed effects. Dose estimation is possible by a number of methods, the measurements made of the film badges, indium foils and criticality packs carried by the persons and also of the activity produced in the body sodium or gold in teeth by neutron bombardment. The clinical evaluation is the most important, for the signs and symptoms remain the best indicators of the severity of the injury backed up by blood examination.

According to the degree of the irradiation, disposal of the evaluated cases would take three routes. Those who had been found to have suffered very high and sub-lethal radiation doses and were showing early distress should not be subjected to long journeys and would therefore be admitted to the nearest hospital. If the indications were of lesser significant injury, the disposal would be to a special hospital unit and it is with this unit that the main concern lies.

The patient would be showing the signs and symptoms of the acute irradiation syndrome and might very well have one or more of the complications of high external

radioactive contamination a significant amount of internal contamination or concomitant physical injury High external contamination and physical injury together form what is perhaps the most serious problem in considering the possible results of nuclear accidents For example there was one accident in which three men died in an explosion resultant upon a reactor excursion The bodies of these men were so radioactive that they had to be disposed of in lead coffins One is left to wonder what would have happened if the effects of the explosion had not been fatal Fortunately this accident is so far unique and the others have been relatively uncomplicated. It will be seen however that the emergency treatment required before transfer of the patient to the special unit might well be quite extensive

The initial requirement for the reception of irradiation casualties is in fact a clinical unit designed for the purpose Essentially the design must be based on the necessity for the maintenance of each patient in conditions of the strictest bacteriological isolation It can be envisaged as a number of single cubicles access to which can only be gained by a route which contains the usual means of achieving sterility of the outside of the person aided perhaps by more sophisticated bacterial barriers such as ultraviolet light "curtains" The ventilation system supplying filtered air would supply it at a slight positive pressure to prevent the ingress of air by other routes The adjuncts to complete the suite would be a decontamination room (outside the sterile area but leading into it) a theatre a sterilizing room a sluice room a kitchen and possibly a laundry Food could be passed through a hatch directly into the kitchen and similarly clothing and bedding could enter and leave the sterilizing room or the laundry As the treatment of these patients might be protracted provision would have to be made for their entertainment The incorporation of glass walls would allow the use of television or possibly even the showing of films while visiting by relatives would also be through glass with perhaps telephonic communication

As described so far the only access to the cubicles would be from within the sterile area Should however any one patient develop an infection in spite of the precautions, due perhaps to the presence of a previous site of chronic infection the isolation of the others would be endangered It is therefore necessary that each cubicle should have another door normally kept sealed and opening into an unsterile corridor Thus in the event of an infection arising by opening this door and sealing the other the patient could be shut out of the sterile suite

The staff to be made available should form a comprehensive team including a physician a surgeon a specialist in nuclear medicine a health physicist and a resident house officer Three nursing sisters would be required one medical one surgical and one administrative and these would have in their charge a suitable number of staff nurses Depending on the circumstances of the accident it might be necessary to complete the team with a public relations officer

Laboratory facilities must of course be available The investigations to be performed are mainly based on blood which at the time is particularly precious to the patient and a plea may therefore be made for micromethods of assay The recommended investigations include the blood cell numbers sedimentation rate clotting time estimates of the non-protein nitrogen and the electrolytes, together with the serum bilirubin. Urinary output is to be measured and routine urinary analysis carried

[illegible] applies that the excretion of the recently discovered urinary aminoacid, beta-aminoisobutyric acid (BAIBA) is related to radiation dose thus forms an important index of damage by reflecting DNA catabolism. Taurine excretion in the urine is also elevated. The stools should be examined for occult blood.

Investigations performed by the health physicist but evaluated in conference include measurement of neutron activated radionuclides for example sodium 24 and whole body counting to measure the amount of internal contamination. These would also be taken into consideration by the health physicist together with his other means of dose assessment to give an eventual conclusion with regard to the individual total dose.

In spite of the continuing research into the biological effects of radiation, the situation remains that there is no specific treatment for the acute radiation syndrome. However this is far from meaning that an unfavourable prognosis cannot be altered by therapy. One can expect to have to deal with serious bone marrow damage gastrointestinal injury and secondary renal and cardiovascular problems. Perhaps the best way to indicate the necessary preparations would be briefly to outline the treatment.

Immediate bed rest bland diet and good nursing are the first requirements. Anti emetics are indicated almost at once for the severe nausea and vomiting while intravenous feeding may be necessary both for nourishment and to maintain hydration. The maintenance of pH and electrolyte balance depends on the indices of the serum pH acid base and electrolyte estimations. In the second or third week after exposure with the increasing depression of haemopoiesis the isolation and aseptic techniques become of the highest importance. Prophylactic antibiotics have been used at this stage but their effectiveness is doubtful and there are some indications that such use has reduced their subsequent value against overt infection. Bactericidal antibiotics should be administered parenterally in high doses at the slightest sign of infection, because in these conditions the infection will progress most rapidly to a fulminating state. If possible the choice of antibiotic should depend on bacterial sensitivity tests.

The haemorrhagic manifestations are treated by the appropriate transfusion therapy a significant fall in the red cell numbers being counteracted by the administration of them. Platelets should be given against the bleeding tendency although the evidence for the efficacy of their transfusion is not clear. In the more severe cases the blood loss from the gastrointestinal ulceration may be very considerable calling for the frequent transfusion of whole blood.

The severe pancytopenia produced by the suppression of haemopoiesis may require the use of a comparatively new form of therapy, that of bone marrow transfusion using cells from a donor of the same sex and matched not only in the major groups but in most of the minor ones. The benefit of this form of treatment is by no means established and it involves a risk of producing "Secondary Disease." It was employed in the treatment of the Yugoslavs injured in the reactor accident at Vinca and it appeared that there was a temporary "take" of the donor cells over the period of maximum depression of the host cells (Mathé *et al* 1959). The donor marrow was then displaced by the regrowth of the host's blood-forming tissue. These people had received potentially lethal doses.

Other forms of therapy may be required in the more severely injured in whom the gastrointestinal effects are pronounced In these gastrointestinal decompression might have to be added to the treatment Secondary renal and cardiovascular failure are the complications to be encountered and the facility for the performance of haemodialysis might turn out to be a prominent advantage Surgical emergencies must also be considered principally with regard to the gastrointestinal effects for the only fatality following the Vinca accident was due to an intussusception

So far no mention has been made of local radiation injury such as that caused by beta irradiation of the skin or the exposure of part of the body for example a hand to penetrating radiation In the first instance that of superficial tissue damage by beta radiation or soft X rays the injury is very similar to that caused by burning except that the duration is more prolonged The treatment so far practised in these cases has been exactly as for burns

In the case of damage by X-rays or more penetrating radiation there is a greater difference with the lesions resembling those of frostbite The tissue exposed by skin loss is quite dry and extremely painful so that it must be given a protective coat of an emollient It has been suggested that the cell death in the frostbite-like lesions is due to the obliteration of the underlying blood vessels and it was in the treatment of a hand injured in this way that we have come nearest to a specific treatment for radiation damage A case has been described where a hand received 70 000 roentgens of X rays and after four months was still badly ulcerated, with amputation apparently the only course of action (Massart and Henry 1961) Administration of "Padutine" a hormonal extract of pancreas completely restored the hand tissue within six weeks

To summarize the requirements for the ideal management of irradiation casualties according to our present state of knowledge are a reliable system of classification which has been found to be that based on the clinical evaluation a hospital unit designed for the reception of these casualties staffed by a co ordinated team and provided with treatment facilities to cope with all the facets of radiation injury

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(Paper given to the United Services Section of the Royal Society of Medicine, 6th June 1963)

Reviews

Diseases of the Digestive System By S C Tinniove M A M D I R C P and P C Rayne M A D M F R C P First Edition Pp viii 696 Illustrated Oxford Blackwell Scientific Publications Price 84s

This is the first edition of this book by two physicians and diseases of the digestive system and the authors address it particularly to senior students and potential gastroenterologists though few could fail to enjoy the lucid English and the balanced discussion of the medical problems with the indications for surgical treatment

Each chapter is followed by a number of up-to-date references for further reading and the index is well compiled There are 207 diagrams radiographs and photomicrographs which are excellently reproduced and the whole book is an excellent example of the high standards of the publisher

The last decade has seen such progress in gastroenterology that there is an imperative need for this type of authoritative book and there can be no doubt that physicians and surgeon will obtain much information from it and obtain it enjoyably J M C

Medical History of The Second World War Army Medical Services Campaigns Vol IV By F A E Crew F R S Pp xiv 687 32 plates 96 sketch-maps and diagrams London H M S O Price 110s

This is a book for the specialist for the really dedicated with a fair amount of leisure and a liking for historical knowledge It is unquestionably a most comprehensive survey factually correct written with patience and imagination and illustrated with a series of dramatic and impressive photographs many of which are quite heart-stirring

This book covers a period when the Army Medical Services had the opportunity and need to show themselves at their best

Few people will read this book from cover to cover but there will be many who will treasure it and in the quiet moments take it from their shelves to share in thought in the hardships and enjoyments of the men who have made this history

For the enquiring medical mind there is a wealth of statistics which are presented with admirable clarity The breakdown of the casualty lists provides much food for thought and it is impossible to find fault with a presentation so representative of the medical services response of a challenge of the greatest significance

This book cannot be reviewed in the normal way especially by a member of a sister Service who remains full of admiration and wishes the volume every success S M

Clinical Physiology Edited by F J M Campbell B Sc Ph D M D M R C P C J Dickinson B Sc M A D M M R C P and J D H Slater M A M B M R C P Second Edition Pp xi 1-605 Oxford Blackwell Scientific Publications Price 57s 6d

The second edition of this eminently successful book has been produced three years after its initial introduction in 1960 The editors are to be congratulated on their choice of contributors who are well-known practising physicians in various parts of the United Kingdom excepting that two clinicians are members of the staff of the Universities of California and Minnesota Each contributor has been responsible for the initial writing of the section dealing with his special interest and there are sixteen chapters covering all the clinical systems of the body To mention but a few there are sections on Circulation Respiration Kidney Bone and Bone Marrow Adrenal Thyroid Pituitary and Sex Glands Alimentary Tract Biliary System etc Each chapter is divided into four sections the first and second dealing with anatomical and structural functions The third is an account of the physiological principles underlying tests and measurements used in modern practice The last section Practical Assessment is essentially a summary of the others showing how the information can be used in diagnosis and assessment in clinical practice References are not included in the text but a selection of monographs reviews and key papers is given at the end of each chapter

In this edition every chapter has been revised with many having more complete descriptions of clinical states Some have been rewritten and two new ones have been added based on neurophysiology as The Nervous Control of Movement with additionally Energy Sources and Utilization which incorporates the blood sugar regulating mechanisms Dr Moran Campbell is to be complimented on his excellent treatise on the physiology of respiration and another chapter on hydrogen ion (acid base) regulation with the partial associated relationship There are many excellent tables of various values in both health and disease, e g respiratory function tests mineral blood values etc In another section a very full description of the many syndromes of renal failure has been given by Dr Lewis

Fifty pages have been added but the format has been preserved with the emphasis on the physiological knowledge which is used in clinical practice The book is recommended for students both in their early clinical years and in the postgraduate stage when they are studying for higher degrees in both medicine and the applied sciences and must be able to interpret the functional disturbances of disease

This volume is said to be unmenting gracefully the union of medicine with physiology and on what more fitting note can this review be concluded? L G T

COMPEN[illegible] Edited by H Gardiner-Hill M B F R C P Pp x + 311 London Butterworth & Co (Publishers) Ltd Price 55s

Books of this kind [illegible] collection of contributions [illegible] adds are always welcome. This volume [illegible] exposition and presents to the student [illegible] independent thought on the major [illegible] medical practice which will help [illegible] at night

The list of contributors which gives authorities subjects the [illegible] ample ments, is in itself a fine recommendation and any criticism could be superfluous

It is difficult to say just what singles a medical text book apart but this book must be read The editors apparently have in mind the general practitioner Certainly this is knowledge which they should possess and one wonders whether or not they should possess it before they qualify In which case the senior medical student should become familiar with its contents

It is, however, so full of information that it might well find a place in every doctor's library to be taken down from time to time for a refresher session S M

PRACTICAL ELECTROCARDIOGRAPHY By Henry J L Marriott M D Third Edition Pp xv + 274 200 figures London Baillière Tindall & Cox Ltd Price 44s + 2s 6d postage

It is rarely that one can claim to have really enjoyed reading a text book on electrocardiography I think this cleanness and precision achieved with a minimum of words is the reason for this

One particularly likes the helpful tendency to summarize which is accentuated by the empanelled salient features of various conditions—thus

> Salient features of left ventricular hypertrophy and strain
> 1 Deeper S waves over right ventricle and taller R waves over left
> 2 QRS interval towards upper limit of normal (0 08–0 10 sec)
> 3 Late intrinsicoid deflection in V 5-6
> 4 Left axis deviation
> 5 ST segment depression with upward convexity in left precordial leads and in whichever limb leads show left ventricular (R) pattern

There are also quiz electrocardiographs scattered through its pages with the interpretation at the end of the book

A small but pleasing feature is the care with which the tracings and diagrams have been synchronized, so to speak with the text one is reading

The book is not large it looks good and feels good and in the reviewer's opinion can be strongly recommended E D C

FAMOUS ILLNESSES By R. Scott Stevenson M D F R C S Pp 239 London Eyre & Spottiswoode Price 21s

It is a strange but human characteristic that with most of us and even as doctors the illnesses of the famous have an enhanced interest and appeal Dr Scott Stevenson has given us fifteen famous illnesses with a fascinating wealth of clinical detail medical controversies jealousies and intrigues ranging from the political wrangling round the bed of the dying Queen Anne to the eleven decorations conferred on the physicians and surgeons who attended King George V—Mr Wilfred Trotter who possibly did most to deserve it refusing the baronetcy which was offered to him

It is of course notoriously easy to diagnose in retrospect but it is salutary to note that in all but one of the cases reported, delay and wrong diagnosis were the outstanding clinical features It has been said that one man's sickness has on many occasions altered the entire course of history and this is perhaps most clearly shown in the laryngeal cancer of King Frederick the Third optimistically and fatally misdiagnosed by Sir Morrell Mackenzie

The controversial cause of Napoleon's death is confirmed as being cancer of the stomach despite those anglophobes who posthumously accused his captors of Arsenical Poisoning To those of us however who have been brought up to the dictum that Waterloo was won on the playing fields of Eton, it must be faintly disconcerting to learn here that Napoleon's unwanted lethargy at a critical moment which helped to lose the battle of Waterloo was due to an attack of thrombosed hæmorrhoids

This fascinating book must have given Dr Stevenson as much pleasure compiling it as it is bound to give to its many readers E D C

TROPICAL MEDICINE FOR NURSES By A R D Adams and B G Maegraith Second Edition Pp viii + 343 Illustrated Oxford Blackwell Scientific Publications Price 42s

This is yet another excellent book from the Liverpool School of Tropical Medicine Though the title is Tropical Medicine for Nurses there is no doubt whatever that this can be strongly recommended as an introduction to the subject for those doctors who do not have to specialize in this field but need to be prepared for occasional contact with tropical diseases

Although it is a second edition it is completely revised and is almost starting again from scratch. Subjects are taken in alphabetical order from Aphasia to Yaws. This is possibly the only point to be criticized, otherwise it is admirably written and abundantly illustrated. S. M.

OPHTHALMOLOGY. A TEXTBOOK FOR DIPLOMA STUDENTS. By P. D. Trevor-Roper, M.D., B.Chir. (Cantab.), F.R.C.S., D.O.M.S. (Eng.). Second Edition. Pp. xii + 648. Well illustrated. London: Lloyd Luke, (Medical Books) Ltd. Price 90s.

This book, as the sub-title makes plain, is for those studying for the Diploma in Ophthalmology and they would be well advised to read it during their training as it contains much that they should know. It is now fairly well established as the third short standard work on the subject and is the most attractive to handle. The author has tried to make it interesting, to read like Hamilton Bailey and in this he has largely succeeded. It must be admitted, however, that at times his choice of words will stop a careful reader's progress like a flint tyre.

Dismissing the mechanism of accommodation on page 108 he writes "alteration of the scleral curvature by extra-ocular muscles is about the only possible method that biology has devised". A better expression would have been "that evolutionary changes never produced".

On page 95 is found "The Schiotz tonometer calibrates the degree a plunger will sink into the cornea". Measures the distance a plunger will sink may not look scientific but is exactly what is meant.

Early glaucoma will often be missed if reliance is placed on estimating the intra-ocular pressure with the fingers. On page 95 he writes "the forefingers can give an estimate to which practice yields great reliability". However there are second thoughts about this for on page 511 is found "digital palpation yields a fairly accurate assessment to experienced fingers". Present day opinion is that ideally all persons over the age of 45 should have routine tonometry at every examination and certainly in any case of doubt. It is not mentioned that a tonometer should always be sterilized before use to prevent the spread of infection. It is implied in the description of epidemic kerato-conjunctivitis and its possible spread by inadequately sterilized tonometers. Also the tonometer plunger should not be allowed to fall on to the cornea but should be gently lowered.

In performing Schirmer's test for tear secretion (page 332) it would be helpful if it were mentioned that it is usual to bend over about 5 mm. of the filter paper strip to hook behind the lower lid and that the lids should be gently closed to stop the strip being blinked out. Some clinics put a small drop of fluorescein on the conjunctiva to stain the part of the paper that is wetted. The strip can then be sellotaped on to the notes as a permanent record.

On page 175 in the description of synopsis it is written "When the same pictures are presented in different colours to each eye the retinal images will be slightly different in size and may then produce a spurious sensation of solidity and this can then happily be utilized in the stereoscope". In fact the pictures were slightly different (stereoscopic pairs) and true stereopsis was possible. This is the old principle of the anaglyph used popularly in the home. Nowadays polarising filters are used instead of red and green to achieve separation of the images.

On paragraph which gave the reviewer a headache is found on page 201 "As a postscript it may be recalled that the foregoing rules of lens refraction ignore the fact that rays of light from a point source can never reassemble at a single point that aberrations (chromatic, spherical and others) severally distorts any of these simple refractive images and that for lenses to conform strictly to these rules they must be infinitely thin". Nevertheless the eyes designed to minimize these defects and to the ophthalmologist who is essentially concerned with setting spectacles to eyes such selective refinements need be of only theoretical concern with so many crudities and imperfections standing between the achievement of an ideal retinal image on the mind within these measure minutiae need never obtrude from the pages of his textbook. An ophthalmologist who should never forget that the eyes are organs of sense that are useless without a mind behind them. To ignore the patient's personality and attitude to sight is to miss much of the pleasure that can be found in ophthalmology and reduces sight testing to the level of a trade.

Anyone not having nor needing special knowledge of ophthalmology should not seek guidance from this book. He should rather consult the special sections in more general works or buy a copy of the same author's lecture notes on ophthalmology. G. A. B.

DISEASES OF THE CHEST. By H. Corwin Hinshaw, M.D., Ph.D., D.Sc. and L. Henry Garland, M.B., B.Ch., M.D. Second Edition. Pp. xvi + 792. 743 illustrations on 308 figures. Philadelphia and London: W. B. Saunders Ltd. Price £7.

The first edition of this book by a physician and a radiologist received much praise in 1956 and progress in both the diagnosis and treatment of respiratory diseases has made a new edition essential. This second edition has been completely rewritten and it provides a magnificent review of every facet of chest disease.

The English reader will be particularly interested in the three chapters on tuberculosis and an excellent chapter on sarcoidosis, but in fact little serious criticism can be made against any part of this book. The index could not be faulted and a profusion of modern references is provided in the text and at the end of each chapter.

The publishers have a reputation which must be difficult to maintain but this production is up to them very highest standards. This book would be a valuable addition to any library. J. M. C.

SYMPOSIUM ON MARINE MICROBIOLOGY Compiled by Carl H Oppenheimer Pp x + 669 \$ 5 \$ Charles C Thomas Publisher Springfield Illinois Price \$22 50

In spite of the increasing interest in scientific problems concerned with Space it is true to say today an ever growing interest in the extensive world beneath the sea This is facilitated by new techniques of diving and submarine exploration and it is inevitable that life in the sea must receive increasing attention This comprehensive book on marine microbiology serves to show how far indeed much study has progressed Thus facets of underwater life methods the basis on which the whole life cycle in that sphere depends So wide is this field that many authors have been consulted in fact there seem to be as many authors as chapters and there are 66 of these Though factually adequate there is an inevitable loss of continuity and style for this reason and some minor errors in the script distract somewhat from the text

This is essentially a textbook for the marine biologist and although its interest is undoubtedly limited its value cannot be overrated

The open ing chapter gives a complete cover of the basic physical make up of the environment which is essential to the subsequent follow up of the activities The histories and varieties of marine micro-organisms

S M

SYNOPSIS OF TROPICAL MEDICINE Sir Philip H Manson-Bahr D T M & H (Cantab) F R C P (Lond) M D Malaya (*Hon Causa*) Fourth Edition Pp xiv + 325 London Cassell & Co Price 15s

To all specialists in tropical medicine this book will be an old friend and to the up and-coming student an invaluable aid in his training

The amazing fact about this new edition is that in these days of rising costs the price should have dropped from 22s 6d to 15s whilst the contents remain relatively unchanged and the book is more attractively presented To say the contents are unchanged is by no means critical previous volumes have always maintained a high standard and the present one is up to date in every respect

As a handbook and convenient means of quick reference in tropical medicine this synopsis is unsurpassed

S M

A SYSTEM OF ORTHOPAEDICS AND FRACTURES By A Graham Apley M B B S F R C S Second Edition Pp ix—371 index 22 London Butterworth & Co (Publishers) Ltd Price 65s

This is an excellent book in which the author has successfully covered the whole scope of orthopaedic surgery and diagnosis in 370 pages The student is catered for especially in Chapter I and the experienced surgeon will find this book a useful source of reference The book appears small, but contains absolutely no padding and no diagrams or pictures This may be considered by some to be a drawback but one feels that the author expects the reader to have a basic knowledge of anatomy and appearances before embarking on his study

The contents are easy to read and in a form which is easy to absorb and the style is very reminiscent of the author as a teacher The new chapter is a most useful guide especially in service in the Royal Navy The references for future reading at the end of each chapter are most helpful and have been compiled with thought and care

This is a valuable contribution to medical literature and the book is highly recommended for those embarking on post graduate study with higher qualifications in view It would also be a useful companion for those going to see whose knowledge of orthopaedics is rusty or rather sketchy

M J B

NOTES ON CLINICAL SIDE ROOM METHODS Prepared by the Board of Medical Studies University of Edinburgh Pp 79 Edinburgh and London E & S Livingstone Ltd Price 7s 6d + 6d postage

This booklet was primarily designed to fill a gap in student training and covers the basic pathological examinations which a ward doctor might be expected to carry out in a well-equipped side room

Each subject is dealt with systematically and the various investigations are described in great detail They range from the routine testing of urine including the Ames Co group of products (Clinitest, etc) to such detailed examinations as the Ziehl Neelsen staining to T B and the Folin Wu estimation of blood glucose As well as describing the techniques of examination it gives a detailed account of the theory behind them The results of the investigations are critically analysed with reference to the limitations of the methods described and the causes of false results The significances of variations from the normal are summarized. A number of simple ward routines such as the urinary concentration dilution test are also included

The book is neatly presented and well indexed though in its present paper backed edition I doubt if it would stand up to the regular use its contents merit A more robust form would prove a valuable addition to a ship's medical library

J F R

MODERN TRENDS IN ORTHOPAEDICS (Fracture Treatment) Edited by John M P Clark *M B E* M B F R C S Pp viii+259 Illustrated with black and white figures London Butterworth & Co (Publishers) Ltd Price 60s + 2s 3d postage

This volume is intended primarily for the orthopaedic surgeon who has got beyond "the rule of thumb" and realizes that the solutions to many of the problems presented to him are not necessarily those outlined in the standard textbooks Nevertheless the editor underlines the importance of the basic truths which are essential and consumte the short anchor to which the mind will revert in any difficulty Each of the nine contributors argues his case as in a court of law giving weight to all aspects of his selected problems

The problems discussed include intracapsular fractures of the neck of the femur fractures involving the knee multiple injuries fractures of the radius and ulna fractures and dislocations of the spine fractures of the shaft of the femur ankle injuries fractures of the tibia and fibula and fractures involving the elbow joint

The contents of this volume are above reproach but so far as the Royal Naval Medical Service is concerned it is only suitable for the hospital libraries One is rather surprised at the price (60s) for neither the binding nor the illustrations, which are not numerous are of outstanding quality

P D G P

THE UNDERSEA CHALLENGE Edited by Bernard Eaton A report of the proceedings of the Second World Congress of Underwater Activities. Pp v + 142 Illustrated London The Falantype Organization Ltd Price 25s

The report opens with a message from His Royal Highness The Duke of Edinburgh and includes talks by such distinguished participants as Emil Mannlicher Commandant Cousteau Dr and Mrs Hans Hass and Dr Jacques Piccard as well as features on "Farming the Sea" "Medical Frontiers of Diving" "History Under the Sea" "Tools for the Job" and the Quest of the Sea"

In any under water project involving man s entry into this new environment the responsibility of medical personnel is quite an one and medical readers therefore will find a valuable fund of information under the heading "Medical Frontiers of Diving" in which a group of specialists outline the problems from short deep dives in prolonged shallow ones with a special emphasis on accident prevention

The publication is stimulating throughout and amply illustrated It could easily be understood by any intelligent layman but for any doctor interested in underwater activities it forms a comprehensive foundation

At present this is an undeveloped and unpublicized field but there can be no doubt that in the years to come it will achieve a growing importance and many will look back upon this report as the beginning of a new era in undersea research

S M

ORAL AND DENTAL DISEASES By Hilbert H Symes Fourth Edition Pp xx 1056 Many colour plates and black and white illustrations Edinburgh and London E & S Livingstone Ltd Price £6 10s + 3s 3d postage

It is rather surprising to be reminded that this book was first published in 1948 It has become such an essential part of the contemporary literature that it is difficult, even for a veteran reviewer to remember that it was not always ready to hand It is described on the title page as a textbook for dental students and a reference book for dental and medical practitioners and much of its great influence derives from realizing that these requirements go hand in hand It is perhaps the first large-scale dental textbook produced in this country to treat the teeth as an integral part of the living animal In truth they are the last anatomical remnants of primitive defensive equipment upon which evolution from protoplasm to the specialized organism largely depended Shell and tooth are the fundamentals of animal life not its appendages, and Professor Symes performs a service in putting the tooth into its proper context

It is not the function of a textbook to advance individual views and here the list of references indicates the diversity of its sources. The informal style of presentation makes it possible to compress the substance into a form that is both easy to find and simple to understand. Treatment is indicated along general lines in most cases but now and again especially in the sections describing minor oral procedures the instructions become specific These lapses into the partisan are always welcome Photographs which are specific by their very nature, are numerous, well chosen and well reproduced particularly the colour plates

It is not easy to praise a work that is already an established classic, except perhaps to say that this latest edition has brought it entirely up to date and its full reputation is richly deserved W E S

EFFECTS OF IONIZING RADIATION ON THE DIGESTIVE SYSTEM By J T Knutsen Pp xi 325 Barking Elsevier Publishing Company Price 90s

The impact of the effects of ionizing radiation on the medical profession is as yet in its infancy but already the realization is growing of the ultimate importance in the profession of this field

A common route of entry of radioactive substances into the body is likely to be that of ingestion consequently the digestive system would bear the first brunt of the onslaught Thus with some justification an exclusive study of this system is most welcome

The book is divided into two parts the first giving in some detail a study of the changes found when the digestive organs are exposed to ionizing radiations and the second part a more general study of changes which take place during radiation sickness

The subject matter is generally speaking factual and amply supported by tables and illustrations It is a valuable book for the specialist in the field of interest to the general practitioner and for those who would wish further information a bibliography of 28 pages provides abundant references

S M

THE DENTISTS HANDBOOK ON LAW AND ETHICS By W R Tattersall H D Berry and E Edmunds Second Edition Pp xi—325 London Eyre & Spottiswoode (Publishers) Ltd Price 37s 6d

The material of a compendium can be measured by the time it takes to get from the Index to the required text This handbook is a compendium in every sense of the word It not only examines every aspect of statutory law as it affects the dental profession but is also a mine of information about the ethical code that dentists have evolved to govern themselves

All the authors have had close connections with the British Dental Association and the sensitive ear can detect the voice of the Association speaking from the pages Nevertheless it is inevitable that exposition of the law should be a single minded entity and that the distinction of principle should be even more decisive when its author is more obscure All this is well done and more In addition to *lege et mores* which affect us all most of the time there is a mass of valuable information to inform on every kind of unexpected circumstance that not infrequently occurs There is an admirable guide to dental jurisprudence including identification of the jaws and teeth Provisions for superannuation and widows pensions under the National Health Service regulations are carefully set forth and relationships between patients colleagues and patients are faithfully and sensibly dealt with

But has not the time arrived at last when we should stop referring to dentistry as a young profession? It is 85 years since the Dentists Act of 1878 Dentistry is one of the oldest professions at least among those required to qualify by registration Indeed it is more jealously restricted to this country than any of them It may be that we are too ready to accept responsibility for irregular practice between 1878 and 1921 by persons who were not members of the profession at all But many illfated medical practices in prim tind to this day our medical colleagues do not accept its eccentricities as reflecting on them Perhaps some of this misplaced sense of responsibility is reflected in this admirable book Whether or not it is an extremely valuable addition to the professional bibliography It is not easy to think of a single eventuality however bizarre upon which it would not throw some light Even the best regulated practitioners might want to claim exemption from any such Moreover in the final analysis it comprises a faithful statement of modest professional ideals

W E S

HANDBOOK FOR MEDICAL OFFICERS OF SCHOOLS ON SCHOOL HEALTH AND COMMUNICABLE DISEASES Thirteenth Edition London J A Churchill Ltd

Medical Officers of the Schools Association did well to issue this handbook which is a compressive summary of the problems likely to confront doctors who choose this branch of the profession It is a combination of basic public health principles adapted to the special circumstances of the school community It contains nothing new but emphasizes the importance of strict medical control in a closed community

It is doubtful whether this could have been published without the help of a commercial organization

S M

We acknowledge with thanks receipt of the following publications

Acta Medica et Biologica Alfred Hospital Clinical Reports Annales Medicinæ Internæ Fenniæ Annals of Tropical Medicine and Parasitology Australian Journal of Experimental Biology and Medical Science Australian and New Zealand Journal of Surgery British Medical Journal British Journal of Surgery Brooklyn Bulletin of the World Health Organization Bulletin of Tokyo Medical and Dental University Dermatological Journal Guy's Hospital Gazette International Review of the Army Navy and Air Force Medical Services Japanese Journal of Medicine Journal of the Irish Medical Association Le Médecin de Reserve Medical Digest Middlesex Hospital Journal Mie Medical Journal Military Medicine Montreal Medical Proceedings of the Staff Meetings of the Mayo Clinic Revista de Medicina Aeronautica Española Saudi Medical Journal Shaw's Alfred St Mary's Hospital Gazette St Thomas's Hospital Gazette Tokyo Reports on Biology and Medicine Tropical Diseases Bulletin Tohoku Journal of Experimental Medicine University of Newcastle upon Tyne Medical Gazette WHO Chronicle Xikagaku Tasiro Yokohama Medical Bulletin

News of the Service

OBITUARIES

Surgeon Rear Admiral J HAMILTON *CB CBE* MB BCh died on 7th January 1964 at the age of 64. He entered the Royal Naval Medical Service on 6th November 1923, was promoted to Surgeon Lieutenant-Commander on 6th November 1929, Surgeon Commander on 6th November 1935, Surgeon Captain on 31st December 1944 and Surgeon Rear Admiral on 31st March 1952. He retired from the Service on 28th July 1955.

D F G writes: James Hamilton served the Medical Branch of the Navy for 32 years and was the outstanding officer of his time. It is difficult after a friendship of nearly 30 years to define in mere words those many qualities which made him unique among his colleagues.

There was warmth and sincerity about him which made a perfect mean after short acquaintance that one had known him for a long time and as is the case with all essentially good men children took to him at once and adopted him to their most intimate confidences.

His first professional love was ophthalmology and for this work he showed great aptitude but as was the quaint custom in the Service of those days, he was compelled to assume the practice of general surgery with a view to assuming the administrative responsibilities for which he was inevitably destined from an early age. The many years of service at the Medical Department in Queen Anne's Mansions London marked the period during which Hamilton made his greatest contribution to the Service. He first held the post of Assistant to the Medical Director General (Flying). This post involved not only problems of aviation medicine—for which he had personal qualification having been an Observer in the Royal Flying Corps in the 1914-18 war—but also the details of sick officers which brought him into contact with the various Civilian Consultants in the Navy. These Consultants without exception held James Hamilton in the deepest respect and affection and this fact did much to enhance the reputation of naval medicine in the civilian professional sphere. He next held the post of Administrative Assistant which included the arrangements for officers' appointments. No officer knew so much about the Service as Hamilton did. He knew the private publics and peculiarities of every doctor in the Branch. He often went to great personal inconvenience to help his younger colleagues in ways which went far beyond the scope of his position. No evidence of this right man in the right place could be better exemplified. The next step was to Deputy Director General at the age of 52 when a young for the Medical Branch. He held this post with distinction keeping a watchful eye as was his wont on all clerical staff appointments as well then proceeding to the Final three years of service as Medical Officer in Charge at Haslar. As sometimes happens in an organization when the length of service in a rank is not duly defined, Hamilton came to the end of his period at Haslar at a time when the superior post in the Medical Branch was not available to him but the University of Oxford in his wisdom immediately appointed him Director of Post-Graduate Medical Studies. This was an inspired selection for a post requiring dignity, accessibility and a keen sense of human sympathy as well as a fatherly comprehensive knowledge of medical education. After a short and extremely successful period of office, sudden and tragic illness forced Surgeon Rear Admiral Hamilton to leave this post and return to his native Ayrshire.

It is impossible for me to write objectively about this man because I loved him and feel comfort in the knowledge of the innumerable friends who felt the same emotion and who deplore his passing but are so greatly enriched by having known him well. No encomium under James Hamilton's influence without indulgence, a subtle and permanent improvement. He married in his forties a lady whom he had known from childhood. This ideally happy marriage created a delightful home life which many colleagues were happy to share from time to time. The whole Medical Branch of the Navy will join in sympathy with Mrs Hamilton and her daughter Elizabeth in their great loss.

Surgeon Captain F C GITTINGS M D died on 25th December 1963 at the age of 91. He entered the Royal Naval Medical Service on 23rd May 1895, was promoted to Fleet Surgeon on 23rd May 1912, and retired as a Surgeon Captain on 13th November 1923.

Surgeon Captain T J O'RIORDAN M B BCh died at sea in the *Lakonia* disaster at the age of 75 years. He entered the Royal Naval Medical Service on 3rd April 1914 and was promoted to Surgeon Lieutenant-Commander on 3rd April 1920, Surgeon Commander on 3rd April 1926 and Surgeon Captain on 23rd September 1943. He retired from the Service on 12th November 1945.

Surgeon Commander J H D TAYLOR M B ChB died on 8th December 1963 at the age of 50 years. He entered the Royal Naval Medical Service on 10th August 1941 as a Surgeon Lieutenant, was promoted to Surgeon Lieutenant-Commander on 10th August 1948 and Surgeon Commander on 30th June 1955.

Dame EMILY BLAIR *D B E.* died on Christmas Day 1963.

Emily Mathieson Blair received her general training at the Western Infirmary Glasgow and served during the First World War with Queen Alexandra's Royal Naval Nursing Service Reserve

before being appointed to the R.A.F. Nursing Service of which she became Matron-in-Chief in 1938 and during the Second World War was mentioned in despatches.

She became Matron-in-Chief of the British Red Cross Society in 1943 and was responsible for nursing training of the V.A.Ds of the British Red Cross Society.

She retired as Matron-in-Chief in 1953, but was a member of the Council of the British Red Cross until her death and a member of the executive committee of the British Red Cross Society and chairman of the nursing advisory board. She was created *D.B.E.* in 1943.

HONOURS AND AWARDS

Officer of the Order of the British Empire

Surgeon Commander C. L. T. McClintock, M.R.C.S., L.R.C.P.
Surgeon Commander I. H. Colles, M.B., B.S.
Surgeon Commander (D) W. E. Sinkey, L.D.S.

CONSULTANT APPOINTMENTS

Surgeon Commander L. G. Topham, M.D., Ch.B., M.R.C.P.(Edin.), Consultant in Medicine.
Surgeon Commander J. M. Cliff, M.A., M.B., B.Ch., M.R.C.P.(Lond.), D.P.M., Consultant in Medicine.

PROMOTIONS

Provisional selections for promotion have been made to date 30th June, 1964.

To Surgeon Captain: L. H. Duthie, M.B., Ch.B., D.P.H., L. G. Topham, M.D., Ch.B., M.R.C.P. (Edin.), L. D. Arden, M.B., B.S., M.R.C.S., L.R.C.P., J. K. Salmon, M.R.C.S., L.R.C.P.

To Surgeon Captain (D): F. H. Grimbaldeston, L.D.S.

To Surgeon Commander: G. A. R. Gray, M.A., I.M.S.S.A., D.P.H., P. F. Toal, M.B., B.Ch., J. Kirkpatrick, M.B., Ch.B., F.R.C.S.(Edin.), D. G. Hirett, M.D., B.S., M.R.C.S., L.R.C.P., M.R.C.O.G., N. J. Blacklock, M.B., Ch.B., F.R.C.S.(Eng.), N. G. B. Hersey, M.R., B.S., F.F.A.R.C.S.

To Surgeon Commander (D): J. L. Edmonds, L.D.S., D. J. Pickering, L.D.S.

To Surgeon Lieutenant Commander: P. J. Banfield, M.B., B.S., M.R.C.S., L.R.C.P., R. H. W. Park, M.B., Ch.B., D.A., J. V. S. A. Davies, B.M., B.Ch., M.R.C.P., A. A. Russell, M.B., Ch.B., J. A. M. Wright, M.B., B.Ch., B.A.O., R. C. Telfer, M.B., Ch.B., M. Hatfield, M.B., B.S., P. S. Hunter, M.B., B.S., D. H. R. Salter, M.B., B.S., M.R.C.S., L.R.C.P., J. A. Gornall, M.R.C.S., L.R.C.P.

To Surgeon Lieutenant Commander (D): R. A. W. Howlett, B.D.S., and P. Moorehouse, L.D.S.

To Acting Surgeon Lieutenant: S. McHugh and D. L. McCurdy.

NEW ENTRIES

Surgeon Lieutenant Commanders: Miss Monica M. McLoughlin, L.R.C.S.I., L.R.C.P.I., D.A.; Miss Anne M. MacGillray, M.B., Ch.B., D.P.H., D.Obst.R.C.O.G., C. Hennybonn, B.A., M.B., B.Ch.

Surgeon Lieutenants: D. J. Vickery, L.M., L.S., R. J. Cole, M.B., B.S., D.Obst.R.C.O.G., D.A., J. K. Norman, M.B., B.S., L.R.C.P., M.R.C.S., D.C.H.

Surgeon Lieutenants (D): N. R. Attenborough, B.D.S., I. M. Barron, B.D.S., and R. J. Biggs, B.D.S.

PRE-REGISTRATION ENTRIES

Acting Surgeon Lieutenant T. R. G. Carter and Surgeon Sub Lieutenant N. B. Hetherington.

RE-ENTRIES

Surgeon Lieutenant Commander J. W. Keogh, B.Sc., M.B., B.Ch.
Surgeon Lieutenant R. S. Mackinnon, M.B., Ch.B.

TRANSFERS TO THE PERMANENT LIST

Surgeon Lieutenant Commanders: D. H. Elliott, M.B., B.S., D.Obst.R.C.O.G., and N. L. Denham, M.B., Ch.B., D.A.

Surgeon Lieutenants: R. L. W. Cleave, M.A., B.M., B.Ch., J. R. Fullerton, M.B., B.Ch., and J. F. Rivers, M.B., B.S.

RETIREMENTS

Surgeon Rear Admiral J. Mansell Reeve, *C.B., O.B.I.*, M.R.C.S., L.R.C.P., D.P.H.
Surgeon Captain I. C. MacDonald, *C.B.E.*, M.D., Ch.B., F.R.C.P.(Edin.)
Surgeon Captain S. H. R. Price, M.D., B.Ch.
Surgeon Lieutenant Commander J. K. S. Mackay (Medically Unfit)

WARDMASTERS

Promoted to Acting Wardmaster Sub-Lieutenant D Ambrose
Retirements Wardmasters R H Lee and K R Avery

QUEEN ALEXANDRA'S ROYAL NAVAL NURSING SERVICE

To be Associates of the Royal Red Cross Second Class

Miss Margaret Ann Parry Superintending Sister
Miss Margaret Kinvannigh Superintending Sister

ROYAL NAVAL RESERVE

To Surgeon Captain D K Wallace *M B E V R D*
To Surgeon Commander P W Harvey *V R D* and P C Morson *V R D*
To Surgeon Lieutenant Commander E E O Smith M B B S D P M C E Halliday M B Ch B P W O'Roen M B Ch B.

RETIREMENTS

Surgeon Captain T E Snell *V R D*—Surgeon Commander D C Lillie *V R D*

CIVILIAN APPOINTMENT OF RETIRED ROYAL NAVAL MEDICAL OFFICER

Surgeon Commander W A Burnett *O B E* M R C S, L R C P, to R N Barracks Portsmouth

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Journal
of the
Royal Naval Medical Service

PUBLISHED QUARTERLY

(The Editorial Board must accept responsibility for the opinions expressed in the Journal)

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ADMIRALTY FLEET ORDERS Inside Back Cover

EDITED BY
THE STAFF OF THE ROYAL NAVAL MEDICAL SCHOOL
ALVERSTOKE HAMPSHIRE

Editorial

This the Fifth year of the JOURNAL'S existence is an appropriate time for stock-taking and every effort is to be made to improve its standard maintain a growing circulation and remain financially stable The success of any Journal must depend largely upon its readers and it is to them that an appeal for suggestions for improvement is made.

It will be noticed that in this and subsequent issues of the JOURNAL the stapling of the cover has been changed This will inevitably lessen the legibility of the writing on the spine but it is hoped that readers will accept this in the knowledge that a saving of £40 a year is being achieved

Frequent criticism is made of the front cover of the JOURNAL and many prefer the naval crown to the present snake and anchor The editors therefore would welcome suggestions as to an alternative It is hoped that many will be received and if so a small committee will be invited to select the most suitable

After much consideration it has been agreed that from January 1964 Dental Officers will be charged the same subscription as their medical colleagues This is felt to be justified and every effort will be made to ensure that Dental Officers have an equal part to play in the JOURNAL'S production and indeed to emphasise this Surgeon Commander (D) W E Starkey *OBE* has become a joint editor

SURGEON WILLIAM JOB MAILLARD, V.C., M.D., R.N.

By Surgeon Commander A. O'CONNOR, R.N.



In a previous issue of the Royal Naval Medical Journal a short history was given of Surgeon William Job Maillard the only Naval Medical Officer ever to be awarded the Victoria Cross and of the deed for which he was honoured ! Although his photograph and the official version of his bravery has been on display at Haslar for some years it has always been a matter for regret that so little was known about him personally and that the whereabouts of his decoration should have been unknown

Considerable interest was therefore aroused when a Reserve Medical Officer visiting the Mess at Haslar, and admiring the collection of medals in the Hall remarked that he had recently met Maillard's sister-in-law who was living in Penarth and that Miss Maillard a cousin once removed was living in Wimbledon The Medical Mess immediately got in touch with both these ladies pointing out how anxious we were to get more information about this officer All the relatives said they would be delighted to help and they provided us with many treasured mementoes that had belonged to Maillard and a great deal of personal information about him

William Job Maillard was born in 1863 at Banwell Somerset He was the son of a Methodist Minister the Reverend G Maillard (who was himself a descendant of Sir Francis Drake) and Winifred Maillard nee Dawkins of Pembroke. He was educated at Kingswood near Bath and later at Dunleven College Launceston He studied Medicine at Guys Hospital (1882–1889) qualifying with the diploma of MRCS LRCP Later whilst in the Navy he achieved an MD London with a gold medal in Medicine, being the first serving medical officer ever to do this

He joined the Royal Navy in 1889 his first appointment being to HMS *Duke of Wellington* the Flagship of the Commander in Chief Portsmouth Thus was followed by appointments to HMS *Ganges Iron Duke Blake Excellent* and then *Hazard*, the Torpedo Gunboat in which he won his decoration during the action in Crete in 1898

In 1893 he married Miss Edith Beresford whilst serving in British Honduras where she was a nursing sister They had no children

Maillard only served a few years after the fighting at Crete He had been appointed to HMS *Daedalus* a Reserve Training ship in Bristol but he became ill and was invalided from the Navy in 1902 He retired to Bournemouth where he was devotedly nursed by his wife until he died on 12th September 1903 and is buried in Wimborne Cemetery His grave is well preserved consisting of a horizontal marble Cross with a replica of the Victoria Cross carved on it His widow returned to nursing joining the Army Nursing Service and was herself awarded the Royal Red Cross. She died some years ago in the Isle of Wight

His Victoria Cross passed to the younger brother Joe who in turn bequeathed it to Maillard's old School Kingswood The headmaster of the School hearing of Haslar's great interest in this decoration very kindly agreed to loan it to the Mess for exhibition with the other medals and decorations won by Medical Officers He also lent us contemporary reports of the action at Candia and a most vivid letter written by Maillard to his brother describing the action while it was still fresh in his mind

Mr [illegible] kind enough to send us Maillard's tobacco jar made from the [illegible] HMS *Orion*, the last sailing Flagship. She has also generously bequeathed to the Mess the napkin ring given him by the ship's company of HMS *Hazard* in recognition. This bravery. Miss Maillard has presented us with several mementos including his formal letter to the Commanding Officer drawing attention to the courage of his sick berth attendant Arthur F. Oates and also of the Captain's steward Richard Saunders who had been through a St John's Ambulance course and who volunteered to accompany Maillard in the boat. She has also given us an engraving of the scene drawn from Maillard's own description, and his miniature Victoria Cross which now hangs below his picture in the Medical Mess. The Mess is deeply grateful to these ladies for their generosity.

The letter Maillard wrote to his brother is so full of interest that we asked Mrs Maillard's permission to reproduce it in full.

HMS Hazard
Candia
Sunday 25th September 1898

My dear Joe

Thanks for your letter — short as it was — I was very glad to get it and I didn't care to hear much about bicycling and tennis just then. You see, I had got the smell of blood into my nostrils and that clears every other feeling out of one's brain. Well it was a miraculous escape for all of us. I quite expected to be dust, or at any rate putrefying by this time. Fortunately I am still on this upper earth. I breathe the upper airs as Virgil says (what is it: inspiro aursa superiores?) Good heavens it was a narrow squeak. I was wondering how I should die whether the Bashis would shoot me or burn me or stab me — I was quite unarmed the whole time. I thought a revolver would only be in the way and I might shoot myself or one of our fellows. Well let us start at the beginning of the whole business.

About a month ago I was told by an interpreter (an Englishman) who was at that time aboard the Hazard that there were rumours of a big row which was to take place in a month or 6 weeks. The plans were to attack the town of Candia at that time in great numbers and try to murder all the Mussulmans in the place. The inhabitants of Candia comprise 4 500 Turkish troops 1 000 Christians and the remainder some 17 000 are Bashi Bazooks — a Bashi Bazook is a Turkish soldier. All Mahomedans are Bashi Bazooks for all of them are armed by the Turkish Government. You know the reputation of the Bashi Bazooks I expect fairly well. Well on the 2nd September (Friday) we got notice to go down to Candia to relieve the "Astraea" (a ship of nearly four times our tonnage and with 3 times the number of men on board) — when I heard this I knew we were in for a row so I got my Jacobson's Surgery to read up amputations etc.

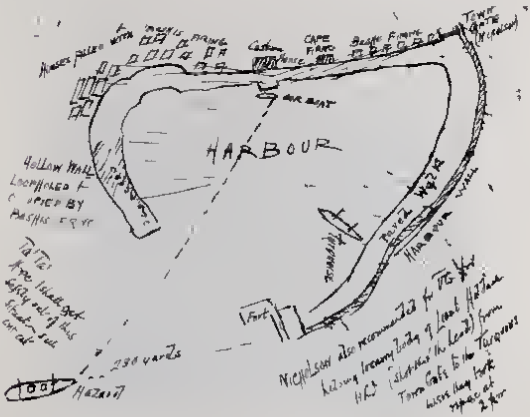
Now another thing had just occurred. The taxes from the country (Christians and Mussulmans) had previously passed directly into Turkish hands and had as you imagine got no further than the Turkish Governor

Edhem Pasha The Admirals of the Combined Fleet determined that this should stop and appointed a *Cretan Christian* as a go between to receive and count the money (of all the mad things in the World) Our Senior Captain Hughes Hallett was against this but his advice was overborne by the other Admirals A day was appointed for the transfer of the taxes from the Turkish Official (6th September) to the Christian Official

Edhem Pasha telegraphed to the Admirals that the Mussulmans of Candia (numbering at this time some 40,000) were in a ferment and begging to postpone the change for 48 hrs. This request was refused — hence the mess

The whole thing was premeditated on the part of the Bashi Bazooks All the morning of the 6th our patrols were walking about the street little knowing that each window held 2 or 3 Bashis armed with Mottmer Henry rifles

I may say that at this time the only English troops here were a weak battalion of the Highland Light Infantry of which 200 nearly were away at the different outposts which are in the country from 8 12 miles from Candia Consequently there could not have been more than 300 of them inside the town Then there was the 'Hazard' with 120 men 40 to 50 of whom are Stokers and not available for landing Besides that we have only 43 rifles in the Ship



Staff Surgeon Maillard's own drawing of the plan of land m

Abont 1 pm 6th September a signal was received by our Skipper from Colonel Reid of the HLI to send a strong gnard to the Town Gate Nicholson our Sub Lt was sent with about 30 men At 2 o clock came another signal saying send a stronger guard The cutter was sent in again with some more men I sent in my Sick Berth Attendant with this boat. A qnarter of an hour after came the signal "Medical Assistance Wanted" The Skipper myself and the Captain's Steward (who volunteered to go ashore to help me) with 5 men rowing started from the Ship As soon as we entered the Harbonr we were nnder heavy fire but the damage was done when we reached the landing place The Bashis had got the exact range, by practising on the cutter which had gone in ½ hr before us As we rushed ont of the boat, and crossed the 20 or 30 yards of space to the Custom House on the Qnay 2 men were killed and 3 wonnded out of the 8 Halfway between the Custom House was a small heap of casks which we used as a halfway shelter Well as we were getting out, one of the wounded men fell into the stern of our boat No one seemed to notice it When we got to the Custom House the Skipper said "There is a wounded man in the boat" so I rushed back to the boat, the firing still continning and jumped into the boat and tried two or three times to raise the wounded man He was mortally wounded I could see but still sensible and he asked me to leave him as he was a dead man — when I got him into my arms I fonnd it impossible to lift him ont of the boat and also to my disquiet I found that the stern of the boat had drifted away from the landing place I realised my failnre and ran for my life to the casks



I lay behind them for a little time shouting for [illegible] and help me from the Custom House but no one came and [illegible] rush to the Custom House The wounded man died 2 or 3 hours after this He was shot in the neck and buttock

I had a miraculous escape I got a bullet through the lower part of my tunic in front left side, and through the upper part of my trousers on that side It narrowly escaped going through my abdomen Had it done so I would have been a deader by now We got into the Custom House and barricaded it with full sacks and boxes of merchandise and for three hours we were besieged The Bashis tried to burn us out We tried to get a signal to the ship for them to bombard the town but it was not until 6 o'clock that Marshall started firing shells He fired 23 and killed many Bashis The firing brought the Turkish Governor down (who pretended not to know any thing about it) and finally at 6 30 pm or so under safe guard of Turkish troops we went out to the Turquoise — I was busy all night long with the wounded men on the Turquoise HLIs Bluejackets and Cretans

At the Custom House a detachment of HLIs took refuge with Colonel Reid

Both Colonel Reid and Lt Cdr Vaughan Lewis have recommended me for the VC but I shall not get it I am perfectly certain of that.'

Then follows a diagram of the action and two postscripts

'Nicholson also recommended for VC for helping to carry body of Lieut Haldane HLI (shot thro the head) from Town Gate to the Turquoise where they took refuge at 2 pm

Ta Ta! Hope I shall get safely out of this situation Still critical'



The Mess at Haslar is extremely proud to have been able to collect so much information about this gallant officer who not only won the only Victoria Cross ever to be presented to a Naval Medical Officer but one of the only Crosses to be awarded when the country was not at war. It is of interest that the first clue came to our notice through the display of medals in the Hall of the Mess. This display always attracts the attention of visitors to the Hospital and we would like to draw it to the notice of readers of the JOURNAL so that they and any other officers might consider bequeathing their medals and decorations to Haslar. In this way their awards will contine to serve as a source of inspiration and encouragement to all those joining the Royal Naval Medical Service.

REFERENCE

(1955) *Journal of the Royal Naval Medical Service* **42** 106

PROBLEMS IN THE MANAGEMENT OF BURNS

By Surgeon Commander James Watt, RN

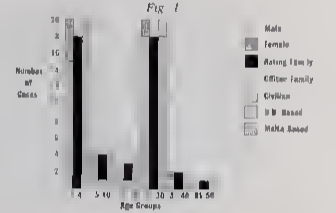
A Spanish proverb warns 'Who hath skirts of straw fear the fire' and while straw skirts may be out nylon pyjamas socks underclothing and all manner of inflammable fabrics are decidedly in and burns seen in the Royal Naval Hospital Malta where domestic accidents provide the majority of cases are often severe Plastic materials remain hot after burning melting into the skin to cause full thickness loss which otherwise might not have occurred Hot tea and fat steam fires and explosive materials (and it is amazing what some people will put in incinerators) accounted for many cases of burns treated in Malta although burns from fireworks which so regularly disturb the Maltese night appear to be no more common in this island than in the United Kingdom where on and around Guy Fawkes day 1961 200 people were injured by fireworks in Liverpool alone and Manchester reported 140 casualties Unguarded electric fires and unsafe wiring provided other cases together with accidents involving primus type and butane gas stoves and paraffin heaters two were the result of an aircrash and one small child had burns of both buttocks caused by his mother sitting him on a pot of boiling water in the belief that it would cure his constipation[1]

For the medical officer at sea however there are hazards enough on board his ship Burns resulting from collisions corrosives paintshop fires aircraft crashes and electric shock steam burns in galleys and boiler rooms providing the respiratory emergency which might require urgent tracheotomy superficial 'flash back' burns diverting attention from other injuries sustained as the man is thrown backwards minor gun-turret burns associated with fatal carbon monoxide poisoning and petrol burns complicated by toxaemic manifestations

DISTRIBUTION

The distribution according to age group sex and status of 50 consecutive burns cases treated in the Royal Naval Hospital Malta during 1961 2 is shown in Figure 1 Of all cases 80 per cent fall into two main groups

Fig 1



DISTRIBUTION IN 50 CONSECUTIVE BURNS CASES

Treated R.N. Hospital, Malta, 1961 2.

(Pre-school and Early-Service age groups account for majority of cases.)



[illegible] Typical [illegible] all [illegible] Typhoid Treated by excision and de-mutome graft
R.N.H. Malta

(1) The pre-school [illegible] group where Male Female 3 1
(b) The [illegible] Service [illegible] group where Male Female — 9 1

The majority of [illegible] United Kingdom Service families and there were only two burns in other [illegible]

PREVENTABLE ACCIDENTS

Ninety five per cent of accidents in the under 5 group were considered to be in this category and resulted in approximately 756 days total disability of which 568 were spent in hospital. We found that explosions from blow lamps primus and butane gas stoves which are used extensively in Malta are not apparently preventable and it should be recognised that compressed gas apparatus is in general unsafe. When children are about some other form of heating should be considered



Full thickness flame burn of [illegible] thigh treated by excision and [illegible] grafting showing satisfactory [illegible] thickness loss at [illegible] pre-[illegible] and requiring [illegible] Recent case R.N.H. Haslar

Five incidents of this nature were investigated involving 168 hospital days and 231 days total disability The unwatched electric iron with its long lead and in secure pans and kettles were other hazards

Safety measures are now pretty stringent in industry generally but far too little is being done to ensure safety in the home and the elimination of children s inflammable clothing particularly night attire

PROGNOSIS

The prognosis in burns is still uncertain and the present position has been succinctly summarised by Bowers and Hughes (1960) of the United States Army Hospital Honolulu

Years of research in the field of burns has reduced the mortality rate by about 10 per cent but this is due almost entirely to the fact that we have learned fluid replacement which obviates death from shock We have not reduced the death rate from infection even with the highly touted antibiotics and burn patients taking multivalent and multitype antibiotics now die of overgrowth of organisms which ordinarily are saprophytic rather than pathogenic Death rate from burns increases with the surface area burned and we know that few patients with a 40 per cent surface burn will survive. We may summarise all this by saying that patients who used to die early of shock now survive to die later of infection'

This is in the main true but there are many other factors responsible for death or prolonged morbidity following even relatively minor burns which are as yet little understood and any approach to treatment ought to be governed by an understanding of both the local features and the metabolic disturbances which occur in burning.

DEPTH OF BURNING

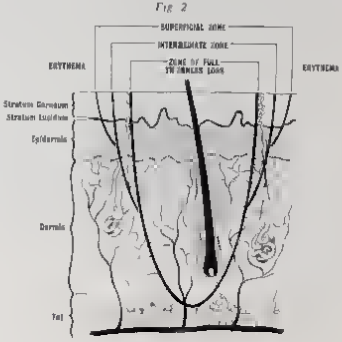
Burns are currently classified as 'superficial' or deep depending upon whether partial or complete skin loss has occurred and segmental charring' where there is regional ablation of tissues at greater depth involving specialised structures While superficial burns should be expected to heal within two to three weeks those in which the basal layer has been largely lost can epithelialise only from the ducts of glands in the dermis itself These are the deep dermal burns'

The affects of heat in a superficial burn vary from erythema due to vasodilatation to vesication due to destruction of the superficial layers of the epidermis. Surrounding the burn there is a zone of erythema

Deep burns have a central area of full thickness necrosis the depth of which depends upon the agent and its duration of action merging at the periphery into a mottled zone of uncertain viability in which extensive thrombosis may already be present or be expected to occur subsequently Beyond this again is an area of superficial burning and finally the erythema of vasodilatation at the extreme periphery It is important to remember that these surface changes extend deeply to a variable degree (Fig 2) The parchment like or brown charred area of tissue necrosis is usually unmistakable It is the area at its periphery which is in doubt and while necrotic skin is invariably anaesthetic it does not follow that anaesthetic skin

surrounding it at the moment of burning will remain so or that skin in which sensation is present will not subsequently be lost Later appearance of the coagulum even in superficial burns is misleading

Fig 2



ZONES AND DEPTH

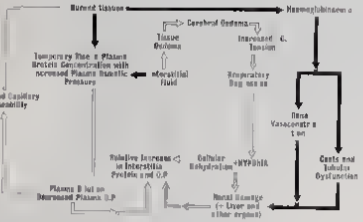
BURNS CYCLES OF METABOLIC DISTURBANCE

As will be seen in Figure 3 several different factors react together to produce what is often an irreversible situation unless prompt action is taken to remedy it Following burning there is first of all a temporary rise in the plasma protein concentration because of the initial loss of water and electrolytes (Cope, Graham and Moore 1948) with in consequence increase in plasma osmotic pressure. This leads to withdrawal of interstitial fluid into the blood stream and thus to plasma dilution

Plasma dilution in turn results in decreased plasma osmotic pressure and relative increase in the interstitial protein and consequently in its osmotic pressure At the same time increased capillary permeability causes loss of plasma like serum at the site of burning but the relative increase of interstitial protein and osmotic pressure together with electrolytic disturbance also initiates another important change that of the withdrawal of fluid from within the cells leading to cellular dehydration In addition later sodium retention and hypoproteinaemia increases tissue oedema But this tissue oedema is general and therefore may involve the brain leading to cerebral oedema with increased intracranial tension In consequence respiratory depression aggravates an already existing hypoxia affecting

Fig. 3

BURN CYCLES OF METABOLIC DISTURBANCE



specialised structures, mainly the kidney, liver and other organs already suffering from effects of cellular dehydration. Thus the possibility of permanent cellular damage is increased.

The kidney, thus already in a vulnerable position has, in fact other influences acting upon it. For instance as the result of considerable tissue damage at the site of the burning, red cells are destroyed and haemoglobinaemia occurs. This affects the kidney in two ways — firstly by renal vaso constriction, no doubt aggravated by the oliguria already present and acting mainly upon the glomerulli reducing the glomerular filtration rate and secondly, upon the tubules causing both mechanical obstruction from casts and tubular dysfunction. Thus cellular dehydration, hypoxia and the results of renal ischaemia and tubular dysfunction render kidney function precarious and are clues to the type of supportive treatment necessary in severe burns, namely, adequate fluid replacement, adequate blood transfusion and oxygen. Dudley Batchelor and Satherland (1957) have used the osmotic diuretic mannitol to combat the effects of haemoglobinuria.*

TREATMENT OF BURNS

First Aid. Clothing should not be removed because of increasing shock and the burned surfaces should merely be wrapped in a clean sheet. Electric burns may be accompanied by cardiac arrest for which external cardiac massage and mouth-to mouth breathing may be required followed by search for and immobilisation of fractures. I do not like Morphia because of its respiratory depressant effect and most cases are relieved by 100 mg. Pethedine which must, however be given intravenously. Cases travel well up to about 6 hours after burning, but are not then fit to be moved again until fluid replacement has been effected.

* Recently in the Royal Naval Hospital, Haslar we have used Spironolactone to block the sodium and water retaining action of aldosterone in shocked states since the renal manifestations suggest that maximal adreno-cortical output in response to stress includes unwelcome hyperaldosteronism.

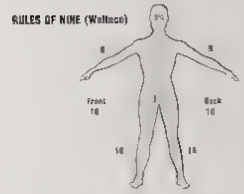
FLUID REQUIREMENTS IN ADULT BURNS

1 *Extent*

The percentage of the surface area of the body burned is calculated from tables and the most convenient are Wallace's (1953) Rule of Nines (Fig 4) This of course takes no account of the depth of burning which undoubtedly influences the prognosis and qualitative requirements It has therefore been suggested that it would be more satisfactory to work out an Index of Severity on the basis of

Fig 4

FLUID REQUIREMENTS IN ADULT BURNS



awarding half a point to each 1 per cent surface area burnt in superficial burns and 1 point each to 1 per cent burnt in deep burns the total giving a more accurate index of the severity of the burn and type of treatment required and this was the method we ultimately adopted The quantities which follow however are based only upon the percentage surface area involved and not upon the Index of Severity

2 *Route of Administration*

Under 15%	Oral fluids only
Over 15%	Intravenous fluid replacement essential in association with what oral electrolytes the patient can take

3 *Qualitative Intravenous Requirements*

15% 25%	Plasma and electrolyte (1/5th normal saline with 4 3% Glucose) with blood if the burn contains any full thickness skin loss
25% and over	Blood alternating with plasma or electrolyte

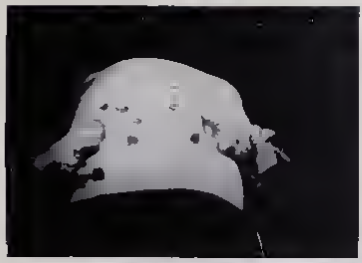
4 *Estimation of Intravenous Requirements*

(a) Colloid needs for 24 hours are on the basis of 1 ml per 1 per cent surface area burned per Kg of body weight (Evans 1951)

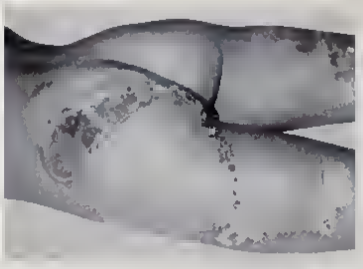
(b) Multiply by 2 to obtain the quantity for 48 hours

Full thickness burns of thumbs and all fingers of both hands in dockyard worker suffering from widespread psoriasis. Recent care: R N H Haslar













(c) Divide the total by 3 and give one third within the first eight hours of the burning one third within the next sixteen hours and the third within the remaining twenty four hours This time interval dates from the moment of burning and not from the time intravenous therapy commenced

(d) Add electrolyte requirements for metabolic needs 1 5 to 3 litres according to body build and climate for each twenty four hours

(e) Estimate the blood requirement which initially must be empirical since of course haemoglobin estimations are unreliable because of oligaemia and haemoconcentration Relatively more blood is given for deep burns where half blood and half colloid or electrolyte may be required Some burns units have suggested that owing to haemoconcentration and viscosity it may defeat the object to give blood too early but others regard it mandatory in deep burns to replace blood as early as possible in order to provide maximum oxygen carrying power and overcome both the hypoxia and vasoconstriction which are present in these cases Later blood requirements are of course assessed by the haematocrit although destruction of red cells is often greater than this would indicate Similarly laboratory estimations of serum electrolytes dictate later electrolyte requirements

5 Rate of Transfusion

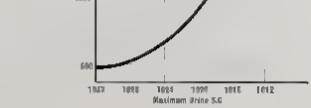
This can be worked out quite simply by multiplying the number of litres which are to be given in 24 hours by 12 the resultant figure giving the number of drops per minute (16 drops from a standard set is equivalent to 1 ml)

NB 1 The extra-cellular space can only be expanded by 50 per cent in 48 hours (that is 10 per cent of the body weight)

2 Massive liberation of potassium occurs from damaged cells in the first 48 hours and as this coincides with a period of oligaemia there is a real danger that by transfusing with electrolyte solutions containing potassium such as Darrow's the plasma potassium may rise above the critical level of 7 m Eq/litre and lead to cardiac arrest For this reason potassium

Fig 5

Relationship Between Maximum Urinary S G and Minimal Daily Urine Volume Necessary to Prevent Nitrogenous Retention (Marriott)



should never be given at hyperchloraemia at a rate greater than 20 m Eq/litre per hour and not more than a total of 100 m Eq in 24 hours (le Quesne 1957) The electrocardiogram provides the only reasonably accurate assessment of the hyperpotassaemic level for normal clinical use

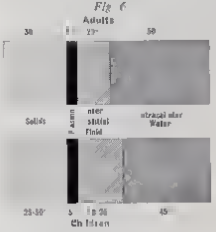
6 Transfusion Control

Very satisfactory estimation of fluid balance can be made by measuring the hourly urinary output via an indwelling catheter A Gibbon catheter carries less risk of infection than the Foley The urinary output in adults should be in the region of 40–80 mls per hour However as Marriott's (1947) graph shows (Fig 5) there is a critical relationship between the maximum urinary specific gravity and minimal daily urine volume necessary to prevent nitrogen retention and I personally have the specific gravity as well as urine output, charted

CHILDREN'S BURNS

In the Royal Naval Hospital Malta many of our burns were in children where fluid requirements must be assessed differently in view of the changing regional surface area percentages relative to age and important differences in the body fluid distribution between the adult and the child (le Quesne 1957) solids and intersitial fluid in the child being increased at the expense of the intracellular water (Fig 6) Fluid replacement in the child may be extremely critical for under transfusion and cooling of the body may lead to rapid irreversible deterioration while on the other hand the child is unable to cope with over-transfusion with the same ease as an adult

Fig 6



Fluid Distribution in the Body

FLUID REQUIREMENTS IN CHILDRENS BURNS

1 Extent

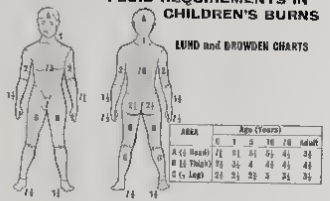
The Lund and Browder (1944) charts which allow for special needs at different ages have been used in our series (Fig 7)

2 *Route of Administration*

Under 10 per cent surface area burnt Oral fluids are usually satisfactory, but frequently have to be supplemented by intravenous colloid (plasma)

Over 10 per cent Intravenous fluids are a "must" together with what oral electrolytes the patient can take These have often to be given by an indwelling naso-gastric tube in small infants who are usually unwilling to drink A naso-gastric tube is also a precaution against gastric distension (a not uncommon complication of burns at any age) since the stomach is aspirated before the oral electrolyte is given

Fig 7



3 *Qualitative Intravenous Requirements*

10% — 15% Plasma plus Electrolyte

Plasma has been used in our cases in preference to Dextran which is still regarded as unsatisfactory for instance Stalker (1961) has demonstrated 'sludging' after large molecule Dextran transfusion and also microscopic changes in the heart and liver In any case it does not provide the essential protein which burn cases require Wilkinson (1958) claims that since it is the albumen component which is lost, plasma is a poor substitute On the other hand human albumen which can be given in small transfusions at high concentration and carries no risk of jaundice is expensive and it is not yet known whether its use in large scale transfusion is entirely devoid of complications Casberg Blocker Levin and Dunton (1959) consider albumen inferior to plasma and advocate pasteurisation to make plasma safe

Children up to the age of 2 years have some difficulty in excreting Sodium through the kidney and for that reason we have given N/5 Saline with 4·3 per cent Glucose as the electrolyte solution until laboratory estimations indicated otherwise.

Over 15 per cent Blood + Plasma + Electrolyte half the colloid needs being met in blood when burns are over 20 per cent.

4 *Estimation of Intravenous Requirements*

We adapted the regimen of Cope and Moore (1947)

(a) 3 mls colloid per surface area per 1 kgm body weight which is the amount for 48 hours–

One third is given in the first 4–6 hours of burning
One third in the next 12–16 hours
One third during the remainder of the 48 hour period

(b) To this is added the daily metabolic electrolyte needs in the form of N/5 Saline + 4·3 per cent Glucose and on the basis of 75 mls per lb (0·45 kgm) body weight per 24 hours (Jolly 1961)
(Neonates up to 2 weeks require no more than 45 mls per lb since their fluid needs are very much less particularly if prematnre)

5 *Later Blood Requirements*

A normal baby has 40 mls of blood per lb body weight On this basis its blood requirement is worked out as $\frac{\text{(Normal Hb} - \text{Estimated Hb)}}{100} \times 40$ mls blood per lb body weight

A child's haemoglobin is subject to wide variations and it is therefore necessary to bear this in mind during blood replacement to avoid over-transfusion using the Haldane table (British Association Plastic Surgeons 1954)

Haldane Standard Haemoglobin

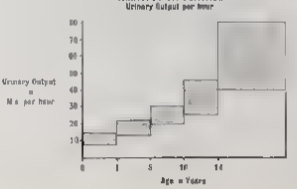
Birth	—	23 grams per 100 ml
3 - 5 months	—	12·2 „ „
6–11 months	—	11·8 „ „
1–3 years	—	11·5 „ „
15 years	—	Adult
Adult Male	—	15·8 „ „
Adult Female	—	13·8 „ „

(100% = 14·8 g per 100 ml)

6 *Transfusion Control*

As in the adult control is by the urinary output per hour but as will be seen from the diagram of urinary output per hour in relation to age this is subject to wide variation and therefore it is essential to use a chart showing the limits for each particular age group (Fig 8)

Fig 8



LOCAL TREATMENT

Local treatment was delayed until the patient recovered from his initial shock. Minor burns require only thorough cleansing with a 1 per cent Hibitane and Cetrimide solution followed by gentle debridement under analgesia. Through removal of all foreign matter and blisters is essential. A small pin hole perforation of a blister, invisible to the naked eye, will, of course, admit organisms and the resultant infection may well cause skin loss over an area that would not otherwise be permanently scarred. This is the rationale behind the modern treatment of the removal of all blisters.

In more extensive burns, it is essential to carry out this gentle debridement under light anaesthesia and most British surgeons would say that in no circumstances should any traumatic or abrasive procedures be used. Madeleine Jeanty (1961) of Brussels University Clinic, however, has suggested 'poncement', a form of dermabrasion using a flat revolving stone until a haemorrhagic exudate appears in the belief that this procedure not only limits oozing from the surface, but also removes the noxious necrotic agents responsible for burns toxaemia.

Following debridement, the area is again swabbed with Hibitane solution and sprayed with an antibiotic spray such as 'Polybactrin' which contains the best topical antibiotics, namely Neomycin, Bacitracin and Polymyxin B.

NURSING REGIMEN

The exposure method in hot climates like that of Malta is often the only adequate one. Obviously, however, it is only ideal in hospital and has several economic disadvantages in that it requires the patient to be virtually isolated and where possible cubicled. In colder climates the environmental temperature must be adequate i.e. for adults about 70 F to 80 F. For small children it often means a temperature of 80°F to 85°F. Nevertheless, for extensive burns in some areas of the body it is the only acceptable method, particularly in those of the trunk, ideally where one aspect only is burned (although where both aspects are affected, the patient may still be exposed and lie on sterile absorbent material*), and of the perineum, genitals and buttocks. The patient lies between sterile sheets, an open ended cradle allowing free circulation of air. Scrupulous barrier-nursing is routine. Burns of the face, owing to the fact that they are usually superficial and that the face has a good blood supply, are usually best treated by exposure except where the eyelids are involved. In such cases coagulum must be removed as soon as it has formed, because even minimal contraction will cause permanent deformity and a little tulle-gras over the lids is often advisable. Where the burns are confined to the face alone, there is usually no problem in treating them in a general ward since, with adequate care, they do not become infected.

There are some areas of the body where, in any climate, the exposure method is contraindicated, e.g. in circumferential burns of a limb where the coagulum as it contracts may act as a tourniquet and in the initial treatment of burns of the

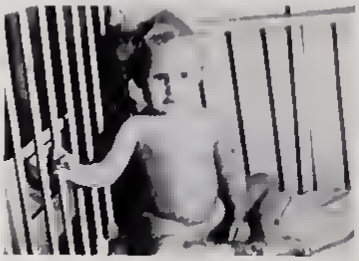
* A 'ripple' anti-decubitus bed is available for this type of case in the Royal Naval Hospital, Haslar.



hand and fingers These do very much better with individual small absorbent dressings for the fingers and gamgee mittens for the hand and wrist

Burns of the hands like those of all the limbs require elevation and in the hands this is best achieved by means of sheet elevation or stockinette suspension or elevation in a sterile polythene sling through which the hand can be seen Rest to the part particularly in the region of joints is essential if early healing is to be ensured The movement of a burnt area overlying a joint will only result in cracking of the coagulum infection and deepening of the area of injury leading either to hypertrophic scar tissue or to delayed healing Light plaster slabs and light plastic splintage is the best form of immobilisation

Splintage however ought not to prevent physiotherapy for the remainder of the body and especially for unaffected joints Of course as soon as the initial acute phase is over and healing of the skin has occurred joint movement must be pursued



diligently The badly burnt patient requires to be turned two hourly if pressure effects are to be avoided This demands almost constant attention particularly when it is remembered that there will be an indwelling catheter and probably a naso gastric tube as well as intravenous transfusion

Burns not suitable for exposure in hospital and superficial burns in adults of limited extent which can be cared for at home should be treated by means of dressings After preliminary debridement the area is covered with wide-mesh sterile vaseline gauze and covered by voluminous absorbent sterile dressings such as gamgee It is essential that secretions should be absorbed If seepage occurs dressings must be changed forthwith because damp dressings allow the ingress of bacteria Some burns of children are best covered in plaster *e g* a plaster boxing glove type of immobilisation over absorbent dressings and tulle-gras with the hand elevated and in the position of function Frequent visits to the theatre in the early stages interfere considerably with the child's feeding On the other hand the treatment of burns in children by exposure is no simple matter since arms have to be splinted and hands covered with mittens But in most instances we found in Malta that this was the preferred method although in areas which involve a limb and the trunk together it may be better in the early stages at least, to utilise a plaster spica

Burns of the buttocks in children up to about 18 months are probably best treated by means of gallows' immobilisation older children are nursed prone over a pillow Burns of the respiratory passages the result of steam or caustics are not common but may require emergency tracheotomy

INFLUENCE OF SITE AND DELAY IN TREATMENT

We found that in patient hospital days in superficial burns of the face chest and hands decreased with age while extent had no influence In superficial burns of the buttocks legs and feet hospital days increased with age and proximity to the extremity of the lower limb where even the smallest percentage surface area required in patient treatment This in turn was adversely affected by delay in admission

No strictly comparable groups could be obtained for the first six months of our survey when the routine had been mutual cover except to observe that lower limb burns during that period all had some full thickness loss This seems to indicate that dressings cause a certain amount of trauma and in the lower limb particularly frequent dressings do seem to cause delay in epithelialisation

Where there was delay in patients reaching hospital the total period of disability was considerably above average for the particular age extent and site

POST OLIGAEMIC PHASE OF TREATMENT

This may be summarised as

(i) the prevention of infection

(ii) the attainment of good skin cover without underlying deep fibrosis

(iii) Supportive measures

These are inter related

(i) *Prevention of Infection*

It is not realised enough that the pH of the exudate passes through two phases first an initial acid exudate phase which permits the growth of staphylococci and haemolytic streptococci resulting from the liberation of amino, lactic and fatty acids from destroyed cells Later after proteolysis is over an alkaline exudate phase begins and the surface pathogens then include Pyocyaneus Proteus and Coliform organisms (NATO Emergency War Surgery 1958) Theoretically one might consider parenteral Penicillin as a prophylactic antibiotic in the initial stages changing to a broad spectrum antibiotic in the later 'alkaline exudate' phase However parenteral antibiotics merely appear to produce resistance and sensitivity reactions and a swab culture sensitivity test and treatment with the indicated antibiotics is the correct procedure

On standard exposure treatment we had only 3 cases of infection occurring after admission — one Staphylococcus Pyogenes and two Pyocyaneus A mild Pyocyaneous infection is not a tragedy and ours were treated quite successfully by local dressings of 2 per cent Phenoxetol solution without recourse to the antibiotic Colomycin which is specific Proteus is no problem in the exposure method but may be so in burns which have been covered and it usually responds to Penbriten I have suggested that these post allogenic problems are inter-related and it is a fact that infection is as much dependent upon negative protein balance and anaemia as it is upon failure to exclude organisms from the treatment area

My own preference is for topical antibiotics following twice daily Hibitane swabbing There are alternative antibiotic creams Furacin and N C P the latter containing Neomycin Chlorhexidine (Hibitane) and Polymyxin We prefer the Polybactrin Spray and while we have had some excellent results with pHisoHex (containing 3 per cent Hexachlorophenel in children s burns we have also had sensitivity reactions which we think may have been due to its use

(ii) *Skin Cover*

As there are two schools of thought regarding the treatment of superficial burns there are also two regarding the treatment of deep burns One believes in immediate excision and grafting the other in waiting until such time as it is possible to decide the depth of burning accurately For the latter it is argued that unnecessarily wide excision may be carried out while a severe procedure particularly in children added to the shock of burning and increasing the total oozing surface area may tip the scales adversely Opposed to this view is the argument that delay leads inevitably to infection and necrotic tissue makes this all too easy There are however situations in which early excision is contra-indicated and those in which failure to excise might lead to overwhelming toxaemia Most are agreed that burns in children caused by grasping electric fires and other hot objects and which are usually full thickness should not be excised initially because it is impossible to decide what is viable and what is not and highly specialised structures may thus be sacrificed



[illegible] months [illegible] full thickness [illegible]'s abdomen [illegible]eck and [illegible] [illegible]ks and [illegible] heterogenic maternal [illegible]rafts on deep fascia R N H Malta

However extensive deep burns with actual charring of the skin and deep tissues are obviously better excised and covered immediately by temporary homografts to be followed within three weeks by auto grafting. It is ultimately a matter of surgical experience and judgment in each case.

The outlook of the early excisers is summarised by Howard (1960) of Philadelphia who defines his programme as 'early standard treatment for oligaemia early delineation of the area of the third degree burn using a Wood's light and intravenous fluorescin to demonstrate the capillary circulation (many British surgeons use the dye Disulpheme Blue (Tempest M N 1961)) early excision immediate heterograft cover and early replacement by autograft'. Purely clinical assessment of depth is unsatisfactory. Certainly full thickness burns are anaesthetic but between the white or charred zone and the hyperaemic area which will

7 days later grafts have taken well



survive is a mottled red area of unpredictable viability jeopardised by vascular thrombosis which makes the survival of early grafts extremely doubtful and further thrombosis occurs during succeeding days This is especially true if unwise attempts are made to place grafts upon fat whereas grafting directly upon deep fascia is very satisfactory The greatest caution must be taken in excising the skin of the face because the most appalling burns often heal with much better cosmetic result than anything that can be achieved by surgery A child in our series who had pulled over a red hot iron sustained a severe burn of the cheek and lips which appeared full thickness both immediately and during subsequent days Even so the final result of conservative management was quite excellent

An argument against immediate excision and grafting has been that while early grafting reduces deformity it does not prevent it because of underlying soft tissue injury and consequent fibrosis e g of tendons and ligaments Many deem it better to wait until sloughs separate than to use thin free grafts which if staged can be taken from the same donor area

It is of course necessary to wait until keloid or hypertrophic reactions have subsided before final definitive grafting procedures are undertaken Hypertrophic reaction is much more common in children than in adults and takes a year or more to begin to settle Pedicle grafting may later be required over joints after excision of underlying fibrosis responsible for flexion contractures Nerves and tendons may also require replacement grafts

If the decision to treat by the 'wait and see' method is adopted it is necessary to wait until the coagulum which is thicker in the more superficial burns than in the deeper burns separates This may be a slow process though enzymatic debridement may help to hasten it

On the whole we have excised early in the belief that infection can thus be largely prevented Thin dermatome sheet grafts are my own preference which if they overlap the normal skin edges will give a good cosmetic appearance The only failure was an immediate graft over flexures and bony prominences in a woman of 38 where I foolishly attempted primary grafting over an area of fat containing vessels which subsequently thrombosed after the initial take leading to rejection of the graft A child who had flexor contractures of the fingers did well with a combination of z plasties and free grafts finally obtaining full movement of all fingers

A word about the recipient area Grafting should be undertaken as soon as healthy granulations appear Sloughs and coagulum can be removed in the operating theatre and a Humby knife does this very well Delay results in unhealthy pale indolent granulations with increasing subcutaneous scar tissue which not only jeopardises the graft's survival but results in shrinking of the grafted area to produce later deformity

Various methods have been used for fixing skin grafts I myself use a certain amount of light pressure by means of saline or flavine wool tying circumferential sutures over the pad without amending the exposure routine However the important thing is to immobilise the area adequately while the graft is taking although there are those who claim not to fix grafts at all Nevertheless while

this might be replaced after a healthy vascular granulating surface has been prepared in an area of good blood supply with all factors favourable it can never be practised at random Experimental work has been directed towards anchoring these with other types of covering and André Dupuis (1961) at Hospital Foch in Paris has dipped his grafts into amniotic fluid before suturing them into position spraying them on succeeding days with amniotic fluid and saline solution

A child of 15 months with very extensive charring of the chest back neck face and arm presented us with an extremely difficult decision It was unlikely the child would survive without excision which necessarily would include removal of the right breast The whole charred area was excised in one block down to deep fascia and maternal homografts applied in broad sheets taken with the electric dermatome. The result was extremely satisfactory the maternal grafts took very well and she was transferred by air to the RAF Plastic Surgery Centre Halton where during the third week when she began to manifest the typical immunological reaction they were replaced with grafts from her own unburned areas thin sheets in fact being taken from the same donor site This child has an identical twin and I was greatly tempted to cover the area with grafts from the twin which would not have had to be replaced but felt that this was scarcely justified in a child with such extensive burning which might not survive

Homografting as in this case may be life-saving and recent work (Peer Walin and Pullen 1960) suggests that skin supplied by the mother brother or sister survives longer than that taken from the father which survives no longer than that from non family donors In Russia cadaveric skin is refrigerated and kept for this purpose

(iii) *Supportive Measures*

A high protein intake is essential to avoid the oedema of hypoproteinaemia and up to 250 grms of protein is required daily However the patient is often nauseated and his general ill health prevents him accepting the diet which is best for him and there is some doubt whether in any case it is satisfactorily metabolised In the early phases it may be necessary to force feed the patient with high protein foods through an indwelling naso-gastric tube This should include concentrates of protein such as egg flips Casein hydrolysate or Complan best administered in milk or soups Alcohol is better avoided especially during the early stages of treatment owing to its adverse vasodilator effects

Generalised oedema often presages death if the protein intake is adequate It is therefore of serious prognostic import but Gibson (1960) states that dramatic improvement has been achieved by the use of concentrated human albumen Some of the more serious cases of burns particularly in children have a marasmic appearance often for a considerable length of time perhaps twelve to eighteen months and then quite suddenly they begin to eat ravenously grow and fill out presumably because of the restoration of some hormonal influence or of some essential metabolic enzyme

Apart from the destructive effect of heat upon the red cells at the time of burning it has been suggested that circulating haemolysins are liberated from the site

of injury and it is certainly a feature of all extensively burned cases that patients fail to make good their haemoglobin without repeated blood transfusions There is also depression of bone marrow function and these cases often improve rapidly after skin cover has been obtained It is however particularly important to make good any haemoglobin deficiency before skin grafting is attempted if a good result is to be achieved

COMPLICATIONS

We have fortunately not been bedevilled by the grim spectre of infection which has stalked many hospitals (Clarkson and Greenwell 1958) Such complications as we have had on the whole have been trivial

Two cases of infection on admission with lymphadenitis 3 cases of infection after admission 1 case of cerebral oedema 2 with otitis media and 3 allergic reactions

Certain special complications of burning merit further consideration

Shivering and vomiting in children, as Nixon and O Donnell (1961) observe are unlikely to be due to cold but more often to inadequate fluid replacement or to infection of an open wound It is indeed a fact that there is a tendency to avoid the trouble that intravenous therapy gives hoping thereby to make good fluid loss by mouth This however is only to invite the problem of hypoproteinaemia and its sequelae Correct fluid replacement, which necessarily includes colloid is essential

Vomiting and shivering may progress to twitching and we observed this in one of our cases Emery and Campbell Reid (1962) have drawn attention to cerebral oedema and spastic hemiplegia following minor burns in young children They report 7 deaths from cerebral oedema following relatively minor burns and one recovery with athetoid spasticity They speculate that this is due to sodium retention by the child's kidney although they found the serum sodium low The children all had convulsions or became unconscious They therefore recommended that a freshly prepared solution of urea should be used as soon as the condition becomes manifest. This is available as 'Urevert' and in two strengths 90 grs or 40 grs of lyophylised urea available for immediate reconstitution Our case was treated by triple-strength plasma and the attack quickly settled without any residual disability There is a case for not using urea where kidney damage is already a feature

Gastro-intestinal perforation and haemorrhage may occur and a case has been reported recently in which boiling water was poured over two children in a bath One of these children died almost immediately afterwards not from the burns but from a perforated duodenal ulcer

Permanent kidney damage may result without initial renal failure which occurs early if it is going to occur at all and is revealed by signs of diminishing urinary output with casts and increasing uraemia with rising blood pressure and high plasma potassium This must not be confused with a similar condition which occurs from 7 to 10 days after burning due to adrenal failure manifested by rising pulse rate, falling blood pressure oliguria raised blood urea extreme prostration and muscular

weakness which is corrected by giving Cortisone Cortisone however in the early stages of burns might be dangerous because of the already high plasma potassium level and might well increase the circulating potassium beyond the critical point

Cope and Phillips (1962) reported that in a series of over 1 000 cases respiratory complications accounted for between 33 per cent and 50 per cent of deaths especially when the face was involved

PETROL BURNS

It has already been pointed out that tracheotomy may be necessary in steam burns and it is necessary perhaps also to emphasise that there is a greater danger from petrol burns than some people would have us believe Proctor and London (1962) in their otherwise excellent book on 'Principles of First Aid for the Injured' dismiss burns by paraffin petrol and trichlorethylene as of little consequence My own experience when I had several of these burns in the confined high octane compartment of an aircraft carrier suggests that when petrol and even petrol vapour are in contact with the skin in a confined space for 15 minutes or more they can produce severe degrees of burning especially if the soaked clothing is held in contact with the skin But also in these confined spaces petrol vapour is inhaled and in my own cases complications included hepatitis and even encephalitis One had methaemoglobinemia all had pulmonary complications and all had nephritis Dr Horace W Gerarde (1961) has suggested that the accidental ingestion of kerosene and petroleum solvents is one of the principal causes of poisoning in children in the United States He has pointed out that the main danger from such accidents comes from a chemical pneumonitis which probably does not originate from blood borne kerosene absorbed from the intestinal tract but from that which has been aspirated into the lungs He states that olive oil retards the absorption of petroleum products while mineral oils appear to promote it and recommends that these cases be treated by the administration of a vegetable oil by mouth oxygen and antibiotics for secondary bacterial pneumonia Emetics and gastric lavage are contra indicated

MASS BURNS

Modern warfare will overwhelm available hospital facilities and demand relatively unskilled voluntary assistance in emergency hospitals with a high proportion of limited superficial burns diverted to domiciliary care There would be three groups (Shaeffer 1958)

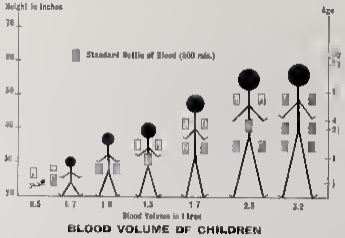
(i) those gravely burned requiring only sedation
(ii) those seriously burned requiring hospital accommodation
(iii) those who could be treated as a domiciliary commitment with up to 15 per cent of body surface burned the important exceptions being burns of the respiratory system and deep burns of the face

(i) *Domiciliary Group*

It has been suggested that following local treatment such patients might be issued with plastic bags capable of holding 1 litre of water packets of 3 gm Sodium

Chloride and 1 [illegible] um Sodium Bicarbonate to provide an electrolyte solution, packets containing a four day supply of broad spectrum antibiotic such as tetracycline with dosage directions and a two-day supply of barbiturate since in the early stages burns are uncomfortable. Most of these will be superficial flash-type burns and exposure should be possible if the home surroundings are satisfactory.

Fig. 9

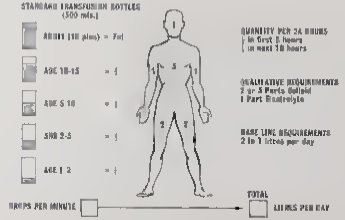


BLOOD VOLUME OF CHILDREN

(ii) *Hospital Group*

Ready reference charts are the only answer to the dearth of trained medical personnel and Fig 9 shows the blood volume of children according to height and age adapted from that used by Birmingham Accident Hospital (Clarke 1959). Fig 10 for display above the bed is based upon one designed by Hunt (1957) with instructions for non medically trained personnel looking after the patient and awards standard 500 ml transfusion bottles to various areas of the body. The

Fig. 10



INDIVIDUAL READY REFERENCE CHART FOR DISPLAY ABOVE BED

[illegible] for children is shown in other. Quantitative and qualitative replacement of 24 hours and normal metabolic requirements are indicated and this method should allow a single circulating doctor to work out quite quickly the number of litres per day and consequently drop per minute required for each individual patient

CONCLUSION

A number of problems remain unresolved. There is for instance uncertainty concerning what goes wrong with the metabolism in cases of burning and how to minimise these metabolic effects. Certainly vigorous early treatment of the oligaemia, early blood replacement and oxygen play their part, but they do not provide the whole answer. Then there is the problem, particularly in mass burns of finding suitable veins for intravenous therapy. Many of these require cut down transfusions with polythene canulae and it is often difficult to find an uninvolved site, so that some alternative to intravenous therapy would be a tremendous step forward. The avoidance of surface infections and the best form of antibacterial therapy require further investigation and the provision also of suitable skin cover at an early stage. Stored skin has its place, but some porous plastic coverage applied by spray as protection against infection or as an alternative to bulky time consuming dressings is desirable. Better methods for securing extensive skin grafts are required.

If the introduction to this paper was inspired by a Spanish proverb, the last word comes appropriately enough from St. James:

> Behold how great a matter a little fire kindleth!

This paper was read to a meeting of the Malta branch of the British Medical Association held in the Royal Naval Hospital, Bighi, in November 1962. Since then two important contributions to the surgery of burns have been published—Clarkson's monumental critical review of Burns in the British Journal of Surgery, March 1963, and A. J. Evans's chapter on "The Treatment of Burns" in "Recent Advances in the Surgery of Trauma" (Churchill, 1963) edited by D. N. Matthews. Consultant in Plastic Surgery to the Royal Navy, to whose inspiration I owe a great deal.

ACKNOWLEDGMENTS

My special thanks are due to the artists of the Technical Illustrators Pool, HMS *Dryad*, who have produced the diagrams, and to my surgical colleagues: Surgeon Lieutenant Commander J. Kirkpatrick and Surgeon Lieutenant Commander N. Blacklock, whose cases have been included, and to our anaesthetists: Surgeon Commander W. M. Davidson and Surgeon Commander A. P. M. Nicol for their patience and skill, especially with babies. Surgeon Commander Nicol in addition gave valuable assistance in the transfusion and fluid balance of these children. Finally I am indebted most of all to the sisters, nurses and sick berth staff who, with characteristic selflessness, spent long hours carrying out tedious treatments with such efficiency that infection was virtually eliminated.

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MISSED DIAGNOSES IN ACCIDENT SURGERY

By Surgeon Commander B Victor Jones, R.N

Accidents have been on the increase in recent years Against a background of steadily decreasing morbidity and mortality from other causes particularly in young people they have come more and more into prominence as causes of death and disablement, in fact they are often referred to as the modern epidemic' This epidemic has brought in its wake a trail of litigation for allegedly negligent treatment some of this has been justified

Most of us find that some of the injured come our way at some stage after their accidents, even if we do not specialise in accident work There are plenty of pitfalls waiting for us Though the diagnosis is often obvious it can on occasions be very difficult and experience shows that for one reason or another a few particular injuries are notoriously liable to be missed' I suspect we have all missed our share — I know I have — and I thought it might be helpful to others who have to deal with accident cases to highlight some of the pitfalls and suggest how they may be avoided

General Principles

All injured patients requiring hospital treatment should be taken direct to accident and emergency units staffed and equipped to deal with major injuries or other emergency cases at any time of day or night (1)

This all sounds fine But in practice it is inherent in the nature of accidents that they so often occur at the wrong place at a most inconvenient time in appalling weather and under various other difficulties the right people to deal with them are often not available We shall sometimes have to improvise and it will always be up to the people on the spot to do their best with whatever is available Nevertheless it is at last realised how inadequately the medical services of this country are organised to deal with accidents particularly I think minor accidents — and a better standard of care may lie ahead This necessary reorganisation however is outside the scope of my article

Take a careful history

This is always a sound medical maxim no less important in the hectic world of accident work than in the slower and more leisurely tempo of some other branches of medicine Here perhaps one's motto should be don't jump to conclusions The patient carried off the football field says he was kicked on the knee — but was he really or did he twist his knee as he and the other player dived for the ball? A patient often says 'my knee was dislocated — this is unlikely but what really did happen? He was unconscious for half an hour you will be told — but the bystander often exaggerates this The story often needs a bit of unravelling When you have sorted out the truth get it down on paper before you forget the details and make sure that it goes on to the next doctor who will be looking after the casualty — he will rarely get as good a chance of an accurate history as you have had

Examine the patient carefully

Of course! But how difficult it may be to do this in practice! The first doctor to see the patient finds him lying on the frozen grass beside the road near to the twisted wreck of the motor-cycle of which he was so proud. He is in severe pain, heavily dressed in outdoor winter clothes and surrounded by an inquisitive crowd. The doctor's duty is to ensure a free airway, make a quick rough estimate of his injuries, stop any severe bleeding, splint his fractures, give him morphia and get him to hospital as quickly as possible — the right hospital as recent reports on accident services have pointed out. It would be quite wrong for the doctor to attempt to make a detailed examination at this stage.

The next doctor, who sees him in the receiving room, is in a better position to examine him. He can at least undress him. But here again assessment of conscious state and shock, restoration of blood volume, respiratory problems and the like have to take priority over detailed examination — and there may be other serious casualties awaiting the doctor's attention too.

And so the patient gets to the ward where the surgeon is told — 'he has a fractured femur, a compound rib and fib, and a scalp laceration'. It is too easy for the surgeon to assume that, because he knows that the two doctors who have already seen the patient are capable conscientious and experienced men, the diagnosis is complete and all he has to do is to get on with the treatment. But this is just where the system breaks down and mistakes may be made, for in fact the first two doctors *have never had the opportunity to examine the patient fully*. Diagnosis often has to be a continuous process going on over a considerable period of time as it does in other medical investigations. Indeed it may not be until two or three days later that the patient is well enough to go to the X-ray department for the final films of the skull or spine to make sure that nothing has been missed — but these final diagnostic touches must not be omitted. Too often the patient makes an excellent recovery from his fractured femur and concussion, but complains bitterly about the ununited fracture of his scaphoid which was overlooked in the concern for his major injuries.

The moral is that at some stage someone must make a really detailed examination of every seriously injured patient, when it is appropriate to do this will vary from case to case, but it must be done *and a record made that it has been done*.

There is one very important exception to this routine of repeated examinations, and that is open lacerations. This sort of thing can happen. A workman lacerates his hand. The surgery attendant dresses it, the works doctor removes the dressing, decides that the patient needs to go to hospital and replaces it. In the receiving room the duty MO has an infecting peep, and sends the patient to the ward where the ward MO does the same before calling the duty surgeon, who also takes the dressing down before deciding what needs to be done.

Now this is all very natural, for we all feel a bit guilty about passing a patient on to someone else without examining him. But it is a splendid way of ensuring that the wound gets infected.

What should happen is that the first doctor to see the patient should, with due aseptic precautions, inspect the wound and make a clinical diagnosis of the extent

and seriousness of the damage. He should do this by noting what movements and sensation have been lost and whether there is any deformity and not by probing about in the wound looking for severed nerves and tendons. He should then dress the wound and carefully record his findings remembering that a picture however rough is worth a thousand words he should not hesitate to say if he thinks repair under a general anaesthetic will be necessary or that a skin graft is likely to be required. Provided this record has been carefully made the dressing should not be taken down again until the patient is in the anaesthetic room ready for his repair operation when the surgeon should remove it just before anaesthesia is induced so that the findings can be checked — contamination under these circumstances is unlikely but even if it occurred it would be much less likely to result in infection than contamination some hours before operation in a surgery where the daily round of boils and whitlows is dealt with.

Though the first doctor may need to have X rays taken to decide whether the patient needs hospital treatment or not he should not waste time having the films taken with a portable machine if it is clear that the patient will in any case have to go to hospital where they might well have to be repeated anyway.

What all this means is that we should rely on the first doctor who sees the patient to decide whether major surgical treatment is going to be necessary or not — and I can see nothing wrong in this.

Children

Children too young to talk present problems. A common one is the toddler who won't stand after a fall or supposed fall. It is essential to have him undressed fully to examine him properly and if careful palpation of the limbs and trunk reveals no tender areas there is no alternative to having an X ray of the whole of both lower limbs and trunk. A greenstick fracture may give surprisingly little in the way of signs even in older children. Recently a boy of six was knocked down by a car and taken to a civilian hospital where a diagnosis of no serious injury was made and he was sent home. His own doctor alarmed by a rising pulse rate and some respiratory distress — probably due to a coincident respiratory tract infection — sent him in to a Naval hospital where X-rays revealed a fractured pelvis. Even retrospective palpation of the fracture site evoked very little in the way of tenderness.

Tetanus

We are unlikely to miss an established case of tetanus it is deciding which case must have ATS that is so difficult. If everyone was immunised with tetanus toxoid there would be no problem — but they aren't. If ATS was a completely safe drug the problem would be slight — but unfortunately it isn't. It is now recognised that giving ATS for every wound is not only unnecessary but an unjustifiable risk and that after it has once been given the effectiveness of further doses for later injuries is doubtful. Much has been written about this problem recently. Most articles rightly emphasise that once ATS has been given it should be followed up by active immunisation with tetanus toxoid so that the problem of giving ATS again for a later injury does not arise and that the practice of active immunisation should be

spread as wide as possible. But they do not give much comfort or guidance to the unfortunate casualty officer, upon whose shoulders the responsibility of giving or withholding ATS in each individual case rests. Should he give the patient ATS and risk a reaction which will at best be unpleasant and can even be fatal, or omit it and risk tetanus, a rare but often fatal disease?

Recently Cox, Knowelden and Sharrard (2) have carried out a full investigation of the use of prophylactic ATS in a busy casualty service. They concluded that it played relatively little part in protecting against tetanus that its use would prevent ATS being effective as treatment if tetanus should nevertheless develop, and that its morbidity — amounting to about 25% — was unjustified. They have given it up, and now rely entirely on adequate surgery and antibiotics. I think this is probably right: we may find soon that we would no more think of giving routine ATS to all injuries than we would nowadays of giving them all anti gas-gangrene serum. But would this approach have satisfied the coroner in the following case?

A child of three dropped a hatchet on its toe: there did not appear to be any open wound. The child's doctor treated it at a cottage hospital: four days later he thought the toe might be going gangrenous and referred the child to an accident unit, where it was thought that the toe was badly bruised only. Two days later the child was admitted with tetanus: the doctor had not given ATS and the accident surgeon had not inquired whether it had been given. When the toe was amputated a small split was found on its under surface. The child died. It must not be forgotten that it is the presence of ischaemic tissue rather than any other feature of the wound that allows the tetanus spores to develop.

Burns

The only comment I have on these is to draw attention to the fact that petrol does not have to catch fire to cause a burn: a man whose clothing is soaked in petrol will get quite a nasty chemical burn if his clothes are not rapidly removed.

Specific Injuries

Head Injury

The diagnosis which is likely to be missed here is the slowly developing subdural or extra dural haematoma. The injury may not have been dramatic and consciousness may not have been lost.

A hospital porter slipped and hit the back of his head on some steps: he did not lose consciousness. A small laceration surmounted a boggy haematoma in the occipital region and was sutured in casualty: the skull was not X rayed because the injury was thought to be trivial. Three days later he was admitted, unconscious, to another hospital where a sub-dural haematoma was released. X rays showed a fracture of the skull in the occipital region.

These important injuries may be missed if we do not follow the rule of keeping all head injuries which *might* possibly turn out to be serious under observation for at least 24 hours. Anyone who has been unconscious for more than a second or two should be so observed — and this includes boxing KO's, as several recent ring tragedies have shown — and anyone with a localised scalp haematoma, especially

in the temperate parts of the world. The cardinal signs of cerebral trouble are drowsiness, vomiting and localised headache, the classical text book features of extradural haemorrhage — coma, dilated pupil, slow pulse, stertorous breathing and hemiplegia — are very late signs and treatment must be carried out long before they develop if it is to have a good chance of success.

If the patient cannot be kept in hospital or sick quarters for observation his own doctor must be told and asked to keep an eye on him, and it must be absolutely certain that this information gets to the doctor straight away — a telephone call is best.

Eye

A junior seaman was hit in the eye by a gym shoe that was thrown at him, and complained that his sight was very blurred. Seeing him shortly after the injury I could find nothing wrong, and thought this was a minor contusion. two days later his vision was unchanged and the ophthalmologist demonstrated to me the vitreous haemorrhage which I had missed with the ophthalmoscope. Unfortunately he did not regain his vision.

Neck

Subluxation of cervical spine

This is an important diagnosis which is frequently missed. The injury is a

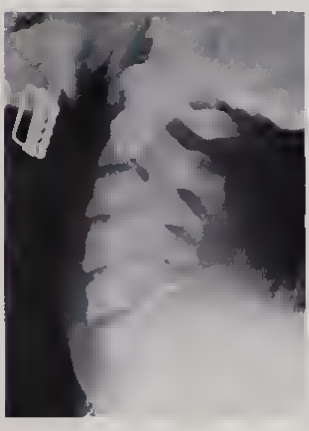


Fig. 1. Lateral of cervical spine in supine position. The subluxation is not obvious, but might be suspected by the flake avulsed from the superior border of C6.



hyperextension or hyperflexion of the neck commonly caused by diving into shallow water or being up-ended under a rugger scrum There is extensive tearing of the soft tissues of the intervertebral joints but because the subluxation reduces itself when the patient lies supine on the X ray table the seriousness of the injury may not be realised

A recruit for the Service who had passed his entry medical examination sustained a hyperflexion injury to the neck when a rugger scrum collapsed on top of him a few days before he was due to join the Service He was seen forthwith at a civilian hospital X rays of the neck were taken but were not considered to show anything wrong In fact re scrutiny of these films did suggest a subluxation of C5 on C6 but the films were inadequate because they did not demonstrate C7 and T1 vertebrae and because laterals in full extension and full flexion were not taken He complained of pain and weakness in the right arm but the significance of this evidence of cervical nerve root compression was not appreciated A few days later having by now joined the Service his pain became much worse after he had dived into a swimming pool There were signs of sensory loss and motor weakness in the distribution of the right C6 root and X rays in flexion showed clear evidence

of subluxation of C5 on C6 (Figs 1 and 2) After six months of conservative treatment he was symptom free and the spine was stable but it was considered unwise to let him continue his proposed career as a high performance aircraft pilot and he had to be invalided

Anyone with severe pain in the neck after a flexion or extension injury should be suspected of having a subluxation particularly if root signs and symptoms such as localised pain and sensory loss in the arm are present Tenderness over the interspinous ligament of the affected joint spreading laterally into the neck is the principal sign in this injury Adequate AP and lateral X-rays of the whole length of the cervical spine must be taken and if these show no abnormality laterals in full but not forced flexion and extension should be done

These injuries are especially dangerous in the elderly when rigidity of the neck due to osteoarthritis causes disruption of the intervertebral discs and apophyseal joints to occur from an injury which a more supple spine could have withstood without damage

Chest

Ribs

Fracture of a single rib as an isolated injury is seldom missed — it doesn t matter too much if it is But paradoxically it seems much easier to miss multiple rib fractures especially when combined with other grave injuries

A very drunk man was crawling under a car in a London Street when the car started up and struck him He was taken to a teaching hospital where he protested against being examined The recently qualified casualty officer found no evidence of serious injury but strongly advised the patient to remain in hospital under observation This he refused to do He died from his nine fractured ribs and the underlying lung damage a few days later the damages awarded against the unfortunate casualty officer were extremely heavy

The best defence against missing fractured ribs is the careful and deliberate palpation of the whole thoracic cage in all seriously injured patients whether they complain of pain in the chest or not with well taken X rays in any suspicious case

Tension pneumothorax should be thought of whenever a patient with multiple injuries deteriorates rapidly I have seen a man s life saved by an alert anaesthetist who put a needle into his chest while the surgeons were arguing as to whether his rapidly worsening condition was due to the effects of his head injury or to haemorrhage from his fractured femur

Dorsal and lumbar spine

Here again fractures may be missed because other injuries overshadow them they must be suspected in any patient who has fallen from a height on to the buttocks or feet Fractures of the calcanei should lead one to examine and X ray the back as a routine

The Abdomen

Ruptured spleen

I had not been a junior casualty officer for long when I missed a ruptured

[illegible] A [illegible] and her three children had all been [illegible] by this bus. Of them appeared to be seriously hurt but the woman complained of slight abdominal pain and showed a curious greenish pallor. I found no abnormal signs [illegible] assuring her however and sent her home. The next day she was re-admitted with an abdomen full of blood and her ruptured spleen removed.

I have looked out for this peculiar green pallor ever since and it has several times led me to a diagnosis of intra-abdominal haemorrhage from ruptured viscus or ectopic gestation. I suppose it is due to a combination of vasoconstriction due to loss of blood volume with a faint haemolytic jaundice due to rapid absorption of blood pigment from the peritoneal cavity. But the pallor without the green tinge once led me to make an erroneous diagnosis of spontaneous rupture of the spleen in a young man with sudden severe pain in the left upper quadrant of the abdomen associated with a haemoglobin of about 7 gms %. He had in fact perisplenitis associated with an acute monocytic leukaemia.

The reason why a ruptured spleen is so readily missed is that the injury often produces a subcapsular tearing of the organ which only bursts into the peritoneal cavity days or even weeks later.

The next ruptured spleen I saw after dropping the first of the two bricks referred to above was of this type. The patient sustained multiple injuries in a car smash — a fractured skull and multiple rib and vertebral fractures among them. I noted his green pallor but my tentative diagnosis of ruptured spleen was not confirmed until exactly a week later when he collapsed dramatically and an urgent splenectomy had to be carried out. The patient was the Dean of the hospital medical school.

Ruptured Bowel

It may be very difficult indeed to decide whether a patient who has had a closed injury to the abdomen has ruptured some part of his bowel particularly the duodenum but the penalties for missing this are severe and laparotomy often has to be done on rather slender indications to avoid the risk of missing a potentially lethal injury.

Penetrating wounds

These are often much deeper than they appear to be. A case in point was that of a woman who had been lifted up by a workmate in a sky lark as she was lowered to the ground the point of a pair of scissors in his overall pocket penetrated her anterior abdominal wall. The wound was less than half an inch long and appeared to be entirely superficial yet it turned out that her transverse colon had been penetrated.

It may be difficult to persuade this sort of patient that the wound is severe enough to necessitate admission to hospital and exploration under a general anaesthetic but these injuries require more careful attention than is possible in the casualty department.

It is worth mentioning here the classical 'pons asinorum' of the penetrating wound of the buttock gunshot or otherwise which goes on through the true pelvis and penetrates the rectum or bladder this can be a fatal injury to miss.

The Shoulder

Dislocations

Anterior dislocation of the shoulder gives an easily recognisable clinical and X ray appearance and is seldom missed But posterior dislocations are much more confusing In contrast to anterior dislocations the patient may be able to get his arm to his side X rays taken in the AP plane may show the head of the humerus at its normal level and hence may be dismissed as normal The patient is often a big fat man in whom palpation of bony points is difficult especially if the shoulder is swollen

The clue is limitation of external rotation which is usually lost almost completely lateral X rays are difficult to get because it is difficult to abduct the arm sufficiently but when they can be obtained they give the game away

The recognition of any neurovascular complications *before* any attempt at manipulative reduction of the dislocation is made, has obvious medico legal importance These vary from a transient circumflex nerve palsy to complete disruption of the brachial plexus and rupture of the axillary artery In testing for circumflex nerve lesions it may be difficult to decide whether the deltoid muscle is contracting or not when the shoulder is dislocated the presence or absence of normal sensation over the outer aspect of the upper third of the arm is a better guide

Rupture of the supra-spinatus tendon and other rotator cuff injuries can be difficult to diagnose even in retrospect it is some consolation to know that operative repair is not often indicated generally rather unsatisfactory and should not in any case be undertaken less than six months after the injury Injection of local anaesthetic into the sub-acromial bursa is helpful diagnostically as well as therapeutically if the patient regains full active movements at the shoulder when the anaesthetic takes effect he hasn't got a complete rotator cuff tear

The Hand

Fractured Scaphoid

That this injury is liable to be dismissed as a sprained wrist is so well known that I hardly dare to mention it yet this mistake is still made quite frequently Any patient who has pain in the wrist tenderness in the anatomical snuff-box and difficulty in opposing the thumb to the little finger must be assumed to have a fractured scaphoid until X rays, which must include oblique as well as PA and lateral views have proved negative both immediately after the injury and again two to three weeks later

A more subtle catch is the patient complaining of pain in the wrist after a recent injury who has in fact an old ununited fracture of the scaphoid which has lain dormant until irritated by the recent injury This state of affairs should be suspected when something more than a fine linear crack is seen on X rays taken shortly after the injury These wrists often settle down again after two or three weeks immobilisation but they should not be kept in plaster for long periods in the hope of obtaining bony union

Dislocation of the wrist

Perilunar dislocation of the carpus and the similar injury of forward dislocation

of the lunate are often overlooked because the interpretation of the X-rays is by no means easy. Clinically the patient has a swollen and painful wrist after a fall on the outstretched hand or other similar injury. In many cases there may be no other particular features but numbness and paraesthesiae in the fingers supplied by the median nerve are very suggestive of some form of carpal dislocation. In any case



Fig. 3. Predislocated [illegible] abnormally wide [illegible] shaft and lunate in the [illegible] facing the [illegible] the living complete [illegible]



Fig. 4. Post reduction [illegible] normal anatomy restored

of doubt it is a sound plan to X-ray the other wrist for comparison — and this helps too in deciding whether reduction of the dislocation is complete or not (Figs 3 and 4)

Cut nerves and tendons in the hand

There is no excuse for missing these but they are not uncommonly overlooked in apparently minor injuries they need not be. If the injured hand is examined methodically Test the pulps and backs of the fingers for loss of sensation note whether there is any alteration in the position of the fingers when the hand is at rest and whether active flexion or extension has been lost at any of their joints If it has a tendon has been cut for the discomfort of even a severe recent wound seldom prevents all active movement. Do not forget to test abduction and adduction of the fingers and apposition of the thumb

The Hip

Dislocations

If the shaft of the femur is intact these will not be missed but when there is a fracture of the shaft of the femur as well they can be overlooked even in the most sophisticated accident units Even if the thigh is grossly swollen, however it is usually possible to demonstrate by palpation that one great trochanter lies higher than the other and if the rule that the *whole* length of a broken bone must be X-rayed in two planes is followed the films will make the diagnosis clear The portable film taken in the casualty department where speed and avoidance of rough handling rightly take precedence may have missed the hip joint because of the short tube-to-film distance the later follow up films of the hip taken perhaps when the patient is anaesthetised for reduction of the fracture must not be forgotten An AP of the hip alone may fail to reveal the dislocation if the head of the femur lies directly behind the acetabulum

The Knee

Torn Cruciate ligaments

The patient who sustains one of these injuries whether from a football tackle or from a direct blow on the knee in a motor cycle crash is brought in with a grossly swollen knee which defies careful examination usually he cannot walk Since conservative treatment, to have any chance of success consists of immediate immobilisation for six weeks it is not acceptable to just let the knee settle down and examine it again a few weeks later The correct management is to aspirate the haemarthrosis straight away under a general anaesthetic gentle but deliberate examination will then show whether there is any undue mobility in the antero posterior plane with the knee flexed (cruciates) or to valgus or varus stress with the knee straight (medial and lateral ligaments) A plaster cylinder is then applied if the cruciates are torn if the medial ligament is torn the presence or absence of associated cruciate ligament or meniscus tears will decide whether this conservative regime is adopted or whether an open operation to repair the ligament is electively carried out

The Leg

Rupture of the tendo Achilles can be overlooked or confused with rupture of

the plantaris tendon (I think this is a genuine entity—do you?) if [illegible] section that the ankle can be flexed quite strongly by the tibialis posterior to flexors and peronei alone But no one with a ruptured tendo Achilles can stand on his toes and palpation of the heel cord reveals tenderness a swelling and perhaps a gap in the tendon This lesion needs surgical repair

The Ankle

Torn lateral ligament

A sprain of the ankle in which disruption of the lateral ligament is severe enough to allow tilting of the talus in the ankle joint mortise is not a minor injury it requires a month or more in plaster and (some would say operative repair of the torn ligament) rather than ten days in a crepe bandage

Injection of local anaesthetic into the tender area followed by an X ray in forced inversion has been recommended to ensure that this diagnosis is not missed When I first did this using local anaesthetic prepared in the hospital dispensary which turned out to be infected the resulting sepsis was so severe that in those pre antibiotic days the possibility that the leg might be lost was considered though the risks would be much less today I still do not think that injections into haematomas are to be undertaken lightly If the lateral ligament is really torn the rocking of the talus can easily be felt by gently inverting the foot with the tip of the finger just below the tip of the lateral malleolus anything more forcible may rupture the remaining intact fibres If confirmatory X rays are taken with the foot inverted the other ankle should be done too for comparison since many people have considerable laxity of both ankle joints

These then are some of the pitfalls which I have encountered I hope you will manage to avoid them

For my part as I read the stories of lapses by our unfortunate colleagues in the annual report of my medical defence society I shall continue to say to myself — There but for the grace of God go I '

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ALCOHOLISM IN THE ROYAL NAVY

By Surgeon Commander G. G. Wallis, R.N

Seafaring has always been associated with drinking and there is ample evidence that in the Merchant Navies of Britain the United States Sweden and Norway the prevalence of alcoholism is higher than in the general population (Rose and Glatt 1961). Reasons which have been advanced to explain this situation include firstly the personality of the seaman associated with which are his motives for going to sea such as escape from home responsibility and close and enduring emotional ties and the desire for excitement and change and secondly environmental factors among which are the easy accessibility of alcohol in ships confined crowded noisy and hot living conditions boredom and lack of exercise at sea and the mariner's need to allay the emotional tension which he has accumulated during the voyage in ports where the recreational facilities other than those associated with drinking are often minimal.

Personality traits in the Royal Navy are probably more akin to those in the other Armed Forces than in the Merchant Navy but the Royal and Merchant Navies share some common environmental factors so that in both there may be a not dissimilar occupational hazard of alcoholism.

Royal Naval Officers in ships may without much restriction obtain their alcohol duty free, the equivalent of a public house gin costing 1d. Male ratings over the age of 20 serving at sea or provided they are not living at home in certain shore establishments are given either 3d or an eighth of a pint of Jamaica rum every day. Wright (1962) in a random sample of 332 male ratings over the age of 25 found that 84 per cent took their tot rather than the money and that this proportion rose with age. He thought that the potency dose of spirit increased the rating's need for alcohol on other occasions and after comparison with a civilian control group concluded that the rating drank much more heavily than his civilian counterpart.

The social acceptability of drinking would appear to be even greater than in the Army and the RAF. Particularly when a rating goes ashore anywhere except to his home he is encouraged to drink. Drinking is 'the thing to do' 'the in-group' pattern of behaviour and a rating who does not drink is likely to feel and possibly to be a lonely outcast. The consumption of 10 to 15 pints of beer on 'runs ashore' several times a week is commonplace.

However in the Navy alcoholism per se is not officially recognised as a justification for invaliding or other alteration of medical category so that unless there is some complication such as dementia or cirrhosis the common practice is to give the alcoholic a primary diagnostic label of neurosis usually depression or chronic anxiety state. Hence over all statistics for alcoholism in the Royal Navy are lacking. But in the alcoholic group at the Royal Victoria Hospital Netley there are some two Naval ratings to every one soldier whereas if the prevalence of alcoholism were the same in the two Services one would expect two sailors to every three

soldiers on which argument the prevalence in the RN is more than twice that in the Army

A rather frequently occurring type of Naval alcoholic is unmarried aged 30 to 40 drinks to the limit of his pay and, after many years of good service has lately lost some of his efficiency Often he seeks medical aid on account of depression and terminal insomnia. Hallucinosis seems to be much commoner than DT's

I used apomorphine quite extensively between 1955 and 1960 when, although the results were difficult to assess many ratings were returned to duty and stayed teetotal for a while but often relapsed within a year or so More recently at Netley I have been able to treat Naval and Army Officers with group therapy sometimes helped by the AA's and the 'abstem' type of drug Results, judged by the criteria of return to and keeping well at duty seem to have been better The main alcoholic group at Netley consists of about eight ratings and soldiers who meet thrice weekly for about two hours and attend two AA meetings a week However for various reasons only one in ten or so go back to duty Most of them learn to anticipate the difficulty of abstaining in the Service environment and enter civilian life with a fair prognosis

I am told that when a rating in the Royal Canadian Navy has been treated for alcoholism and is returned to duty special arrangements are made for him to be drafted to a ship or establishment where there are already other trained alcoholics and where they can keep in close contact with the AA

Prophylactically experiments in the Merchant Navy with making ships 'dry' have led to terrific compensatory benders ashore There can however be little doubt that the risk of alcoholism in the Services could be reduced by a greater awareness of the problem. better education and earlier diagnosis

I am indebted to Surgeon Rear Admiral J M Holford OBE QHP, FRCP for permission to publish this note.

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(Contribution to discussion of Symposium on Alcoholism held by the Services Group of the Society of Medical Officers of Health on 31 Jan 1964)

A POOR MAN'S "KINSEY"

By Surgeon Commander G R Wheldon, R.N.

In 1961 while serving in a cruiser on the Far East Station I instituted a series of lectures as part of a campaign against venereal disease beginning when the Commission was about three months old All members of the Lower Deck were required to attend in groups varying from 10 to 30 at a time Each lecture lasted about 45 minutes with a period at the end for questions

On the night before delivering the first lecture it occurred to me that I might not be completely with it' in respect of the attitude of the present day sailor to extra-marital intercourse and kindred matters To find out what this is, I decided to offer each rating who attended a questionnaire to be completed before leaving the place of lecture

The following procedure was adopted for compilation

(a) The purpose of the questionnaire was briefly explained

(b) It was made clear that there was no compulsion to complete the questionnaire

(c) No mark was to be made on the paper which could lead to the subsequent identification of the compiler (For this reason ratings were not asked to give their ages)

(d) While answering the questions ratings were spread apart to preclude collusion etc

(e) The lecturer was available to explain any question which was not clearly understood

Questionnaires were handed to approximately 550 men Of these 470 supplied answers

Question 1

Are you (a) Married?
(b) Engaged?

Results

(a) 184

(b) 60

(c) 226 (this figure is arrived at by subtraction of 184 + 60 from 470 and the group is henceforward designated 'Fancy Free')

Question 2

Do you think it (a) morally or (b) socially wrong to have sexual intercourse outside marriage?

Results

	Yes	No	Totals
(a) Married	124	46	170
Engaged	32	27	59
Fancy Free	86	125	211
	242	198	440
	Yes	No	Totals
(b) Married	108	55	163
Engaged	35	22	57
Fancy Free	81	131	212
	224	208	432

Question 3

Have you ever indulged in sexual intercourse outside marriage?

Results

	Yes	No	Totals
Married	127	54	181
Engaged	42	14*	56
Fancy Free	137	69*	206
	306	137	443

* It follows therefore that out of 286 unmarried men only 83 were virgins or rather more accurately only 83 out of 262 answered 'No' as an acceptable reply

Question 4

If the answer to Question 3 was 'Yes'

(a) Did you regret it later?

(b) Would you have indulged if you had been stone cold sober?

Results

	Yes	No	Totals
(a) Married	72	49	121
Engaged	15	27	42
Fancy Free	44	112	156
	131	188	319

	Yes	No	Totals
(b) Married	45	58	103
Engaged	16	26	42
Fancy Free	90	38	128
	151	122	273

Question 5

Do you look down on someone who has VD?

Results

	Yes	No	Totals
Married	12	158	170
Engaged	4	53	57
Fancy Free	25	200	225
	41	411	452

Question 6

Would the thought of catching VD deter you from intercourse outside marriage?

Results

	Yes	No	Totals
Married	139	29	168
Engaged	42	16	58
Fancy Free	147	70	217
	328	115	443

Question 7

Are you deterred from carrying a French Letter because you have to ask for it?

Results

	Yes	No	Totals
Married	36	139	175
Engaged	10	48	58
Fancy Free	41	173	214
	87	360	447

Question 8

Have you had intercourse during this Commission?

Note From the time of arrival of the Ship's Company in Singapore to the completion of the questionnaires (a total of 83 days) 44 days were spent at sea

Results

	Yes	*No*	*Totals*
Married	54	124	178
Engaged	19	40	59
Fancy Free	88	136	224
	161	300	461

It will have been observed that in all cases there are discrepancies in the totals. These result from my discounting all questions which were answered other than by a plain 'Yes' or 'No' answered ambiguously e.g. 'Yes and No', Sometimes... etc or not answered at all

Post scriptum

At the end of the Commission which lasted 18 months there had been 222 cases of Venereal Disease as follows

Junior rates

Married	*Single*	*Total*
44*	151	195

* included 11 infected twice or more

Senior rates

Married	*Single*	*Total*
21*	6	27

* included 2 infected twice

Summary

In an attempt to discover if a new or different approach to the problem of venereal disease in the Navy is required a survey of the opinions of 470 ratings on extra marital intercourse and kindred subjects was conducted in a cruiser on the Far East Station

Conclusions

1 Chastity for its own sake is no longer thought a merit
2 The social stigma of VD has virtually disappeared
3 Alcohol still remains a major factor in causation by weakening of resistance to temptation
4 Fear of VD is still a powerful deterrent

Suggestions and observations

Nothing must be said or done which will deter a man from reporting his suspicions that he has contracted VD I refer in particular to moral judgments pi jaw sermonising and disguised punishment such as stopping Rum and Leave for longer

periods than are required to render the patient non-infective Every lecture must give in detail the signs and symptoms of venereal disease in such a way that even the dullard can understand The possible consequences of failure to seek treatment at the onset of symptoms must be disseminated very frequently and by all means possible lectures informal talks and discussion groups posters private consultation and films In passing I am bound to say that I have yet to see a film on VD which did not, at some stage provoke laughter from the audience hardly the right climate for a serious subject Facts and sordid realism would be more to the point Prompt and efficient prophylaxis must be preached and a condom should be recommended as an essential item of every man s shore-going equipment — just in case' Liberty men should be encouraged to keep together in groups ashore especially when on a 'Drinking Run In the Sick Bay sufferers from VD should not be separated from the others Even though it may be easier for the MO and the Sick Berth Staff the holding of a VD Clinic is to be deprecated on the grounds that it mixes the skates with the weak-willed in an old fashioned and unprogressive way In many cases an Unaccompanied man merely wishes for female companionship without copulation and to provide this frequent and regular Socials and Dances should be held in Naval Bases abroad with selected hostesses transported to *and away from* the dance hall under the chaperonage of the staff of the Naval Provost Marshal This system worked perfectly well in Germany in 1946 under much more difficult conditions than obtain today

ACKNOWLEDGMENTS

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My thanks are also due to Surgeon Vice Admiral D D Steele-Perkins CB CVO QHS FRCS FRACS DLO for permission to publish this article

MEDICAL REMINISCENCES

By Surgeon Commander J C Wyatt, R.N. (Retired)

When I retired from the Royal Navy I returned to Cape Town and worked in the Tuberculosis hospital until I was appointed Assistant Medical Officer of Health In the hospital I had charge of the children's and the Malay's wards The reason for having a separate ward for Malays is that being Moslems they require their food to be specially slaughtered and cooked I was somewhat disappointed to find that none of them spoke Malay and as for the Afrikaans that I learned while serving in *Afrikanda* it bore little resemblance to the colloquial dialect spoken by the patients

The state of the average patient on admission is far worse than anything seen in the UK today Many come in practically moribund I should have said earlier that all the patients are either Cape Coloureds or Natives and they are very bad attenders at the clinics And as they keep moving it is very difficult for the Health Visitors to keep a check on them But it is surprising what can be done for them if they can be tided over the first few weeks Gross pleural effusions are common and to aspirate over a litre causes no surprise The hospital carried out all the surgery on all Tb patients in the Peninsula and there was an average of six cases of major chest surgery a week as well as the more normal stuff of appendices hysterectomies and mastoids I found my first night duty a bit hair-raising as I had to give a blood transfusion to a child of two who just had no veins in the normal places When I did cut down I found a thing the size of a piece of cotton I have since learned that the scalp veins are easier

The following cases will illustrate what the hospital has to cope with

J W aged 7

History Well until 8 months old when he was admitted to hospital with Tb He remained in hospital for 2½ years and was then discharged to the care of a clinic but he did not attend for long His father died in the Tb hospital after having absconded twice The child arrived at hospital unaccompanied by any member of the family Examination revealed a miserable wreck almost moribund covered with lice very small for his age weight 18lbs oedema of feet and hands and puffy eyes. Temp 95 0F pulse 92/min rickety rosary pallor of conjunctivae enlarged left cervical glands decreased air entry at both bases liver enlarged to 2 fingers spleen to 1 finger Hb 6 5 gms % WBC 13 000/cc (P9E 1 L 2 %) ESR 44 Chest X ray bilateral pleural effusions calcified right hilar lesions

Treatment Blood transfusion Aspiration of right side of chest 300 ccs blood stained fluid removed Streptomycin 200 mgm b d KCL ¼ grm tds Mycostatin 200 000 u INH 50 mgm b d and Madribon daily for the multitude of septic sores

Progress Feeding was started with full cream milk through a nasal catheter and after a few days his condition had improved so much that normal feeding was tried

But he had apparently forgotten how to swallow so that Sister had to massage his throat to teach him in fact he found it easier to swallow semi solids than liquids It now became very evident that he was very mentally retarded His mother who now visited him for the one and only time made the illuminating remark that he was very fond of water Since normal feeding was started he has made good progress

Case 2 J D aged 7

History Well until one month ago when he had flu complaining of body pains He improved after 8 days One week ago he started coughing and had difficulty in breathing He was taken to a doctor who diagnosed Bronchitis but as his condition deteriorated he was admitted to hospital Examination revealed an acutely ill and very dispnoeic child who was very small for his age weight 27 lbs Gross pallor Hb 5 5 gms % bronchospasm liver enlarged to 3 fingers X-ray of chest Large paratracheal and hilar nodes bronchial narrowing, obstructive emphysema of right lower lobe and compression of the right upper lobe ESR 35 mm/hr

Treatment Put in an oxygen tent oxygen through Alevaire given Tetrex and Aminophyllin and Chloral for sedation His condition improved only to relapse so he was taken to the theatre given 300 ccs of blood and a tracheotomy and a thoracotomy were done In order to mobilise the right lung dense adhesions required extra pleural stripping over the upper lobe and a lot of dry caseous material was removed from the subcarinal glands More blood was given post operatively than had been lost at operation

Progress One week after operation X ray showed the right lung to be practically fully expanded but the mid zone was solidly infiltrated Two months later X ray showed a great deal of clearing of the consolidation The child is gaining weight steadily and would like to run about with the others

Case 3 J B aged 8

History 3 weeks of chest pain coughing and continuous epigastric pain was feverish all the time and showed marked loss of weight No Tb or infectious contacts

On admission he was very ill grossly underweight at 32 lbs, 3 fingers liver enlargement with soft swelling on anterior surface solid left lower lobe of lung

A laparotomy was performed limited to the liver area in view of his condition Tuberculous infiltration of the liver was seen and the bowel was matted Tuberculous bacilli were seen on histology from the necrotic area and Kirshner culture of the peritoneal fluid was positive Sigmoidoscopy revealed no Amoeba Chest X ray showed pneumonic consolidation of the left lower lobe Barium swallow showed a diverticulum at the level of the bifurcation of the Trachea with the appearance of a traction diverticulum Stool culture showed no Amoebae

Progress Although given blood transfusions and full anti Tb treatment he did not respond well swinging a temperature for two weeks and not gaining any weight

The Kirshner culture of the gastric washings was positive He was put on Prednisone and the response was most gratifying as he started eating well and gaining weight but he then started having abdominal pain and vomiting As all investigations of the gastro intestinal tract were negative the PAS was stopped and he recovered immediately The Prednisone was slowly discontinued In two months he has gained 5 lbs in weight and a liver function test was normal There is some difficulty in interpreting liver function tests of Coloureds and Natives as the figures bear little relation to those of White people

Reviews

THE INFECTED HAND By David A Bailey MA M Chir FRCS(Eng) Pp viii + 196 100 illustrations London H K Lewis & Co Ltd Price 30s

This is a new book and is devoted to the problems of the diagnosis and treatment of that extremely common and all too often mismanaged condition the infected hand

Mr Bailey has divided his book into 3 parts The first deals with the general principles upon which modern management is based and includes an excellent chapter on the technique of local anaesthesia while the second part deals fully with the common acute hand infections The third part describes some of the less common infections and other traumatic lesions which may simulate infection such as grease gun injuries Also briefly dealt with in some of the general disorders which may affect the hand together with other miscellaneous local infections of the hand

Much of the treatment of hand infections is still based on methods learning which sometimes to be described as many medical students surgical textbooks and is followed by many who have not had the benefit of a surgical apprenticeship in a hand division devoted to hand surgery Hand infections are not only a major surgical problem but their management is extremely considerable There is no doubt that the modern methods of management so ably described in this book have done much to reduce chronicity and to diminish the length of time spent off work on account of hand sepsis

In dealing with the infected hand accurate and early diagnosis followed by correct initial treatment is all important. This is a book which should be read and digested by every Naval Medical Officer who will realise that he has the means be he at sea or in a remote shore establishment of carrying out himself the correct method treatment of hand infections which are of such common occurrence in Naval Medical practice

In the writer's opinion this is a book which should be added to every ship's medical library

J R K

VIBRATION RESEARCH A collection of studies sponsored by the Human Factors Society Pp viii+111 Illustrated Oxford Pergamon Press Price 35s

As the title suggests this volume consists of a collection of recent papers by various authors dealing with the effects of vibration on the human body The papers were published in the October 1962 edition of Human Factors the Journal of the Human Factors Society and are reissued in book form for the benefit of research workers shipbuilders and designers of all kinds of vehicles ranging from motor cars to space craft Many experiments using human volunteers are described and the forbidden of the subjects investigated inspires feelings of profound admiration

This book is not light reading and it contains little of direct interest to the layman Much of the mathematics in some articles is formidable and beyond the comprehension of the lay reader Nevertheless it is clear from the text that vibration has very considerable effects on human capability and it therefore behoves the medical worker to keep abreast of developments in this field With the advent of space travel and the evolution of faster land sea and air vehicles requiring optimal mental and physical performance of their crews the problem is a growing one

Vibration Research is a well produced book and will doubtless be as valuable to workers in the field as the editor hopes If however the article by Richard J Hornick entitled Problems in Vibration Research had been the opening rather than the concluding one it would have served as a very useful introduction to the subject matter of the book J D W

THE AGEING EYE By R A Weale PhD DSc Pp viii + 200 118 illustrations London H K Lewis & Co Ltd Price 35s

This admirable work is evidently a thesis by a Physiologist who is devoted to this particular subject As a result it is perhaps a little overpowering for the mere clinician if taken in too large a dose

Dr Weale gives a highly detailed yet concise account of the changes of ageing in the human eye from childhood to senility He starts with a systematic description of age changes in the various ocular tissues then passes on to the physiology of refraction accommodation and presbyopia Finally there are chapters on the electrophysiology of vision and the changes which take place in this during the normal life

This is a book for the general ophthalmological reader to dip into from time to time for it contains such a large amount of information some academic and some of very real everyday use — e g the treatment of presbyopia

The book is very well presented and there is an excellent index and bibliography H J A H

THE FLEET THAT FACED BOTH WAYS By Anthony Hinchliff-Smith Pp 232 London Anthony Blond Ltd Price 30s

Many books have been written covering the events during the early years of the Second World War and most of these have of some measure alluded to the fall of France and the

subsequent annihilation of the French Fleet at Mers-el with the exploits of [illegible] vessels have been through the eyes of one person missing from the book or how they had affected him. [illegible]'s book has been Anthony Heckstall Smith's [illegible] freed a document which attempts to resolve the ambiguities in the light of official and unofficial documents and letters to which he has been given access. Many papers which could have shed further light on some of the events are still classified material and so even now the evidence is unexplain and wrong, mistakes must always be drawn. Notwithstanding this A.H.S's book will be unmatched because of the vast amount of research he has obviously done in order to produce these facts and then to present them in such an orderly I would even say exciting way.

This book is no long dreary collection of facts—and facts are strung together in any fashion but a narrative as enthralling and pertinent as this I have read in book which was truly difficult to put down once started. In the best tradition of all tragedies for this is a tragedy you are encouraged by the style to rush on in order to see who turns out to be the villain of what this admiration tragedy will be.

What made Darlan and the way he did? Will Somerville really open fire? Why did Churchill make such perfidious decisions which almost made this war in Europe a triangular match? These questions and many more are raised in the reader's mind as the plot unfolds. Some are answered but others remain open such as the full reasons surrounding the sacking of the Fifth Admiral Sir Dudley North.

The author takes us from the beginning when Fennouis Darlan became France's First Admiral of the Fleet through the signing and bargaining of the Armistice with Nazi Germany and the slaughter at Oran and Mers-el-Kebir. Bizerte and Dakar Storez to the final debacle at Toulon.

Through all this runs the train of treachery and unwise decisions of our Cabinet which caused more suffering than bears thought. It is a constant source of amazement that we ever made the decisions necessary to win the war or that we didn't finish the war with more casualties than when we started.

It is a tribute to the Royal Navy that we had Admirals such as Sir Dudley North, John Cunningham and James Somerville who were able to temper the Cabinet decisions with sympathy and humanity. But for man such as these the course of the war may have been very different. Every budding sailor should do well to read this book and follow their example.

The only criticism is that with the number of characters involved it is a pity a list of them and their responsibilities was not included at the beginning of the book. This would have helped in setting people into their actual positions.

This is a magnificently produced book and well worth the price of 30s.

I. L.

PORTFOLIO OF CHEST RADIOGRAPHS. By Ian Roux MB ChB FRCSE and T. C. Dodds. Pp 307. Edinburgh & London: E. & S. Livingstone Ltd. Price 60s + 2s 6d postage.

This is a new book which has been published to make available to Undergraduate and Post Graduate students a representative series of chest radiographs in a conveniently portable form. In all there are 300 so called figures and many more actual radiographs as in several cases a figure comprises a series of 3-4 photographs on a single page. The book is divided into three sections firstly the radiographic anatomy of the bronchi and both lobar and segmental systems, secondly the abnormalities in the chest wall lungs and pleura and finally the mediastinal shadows including the diaphragm and oesophagus. In each sub section there are a few pages of text followed by several reproductions of clearly identified radiographs with short explanatory notes below each illustration.

This portfolio is not a textbook of respiratory diseases but rather a combination of a number of radiology atlases which the above named specialty is dependent. It is a personally collected series of radiographs illustrating variations of common lesions and frequently occurring abnormalities rather than individual examples of rare disease.

Students preparing in radiology, thoracic surgery or the study of respiratory diseases will find much of value in this book as equally from it as from collections of their X Ray films will they be able to attain skill in discussing radiographic appearances during the course of their professional examinations.

L. G. T.

A SYNOPSIS OF GASTRO ENTEROLOGY. By G. N. Chandler MA DM MRCP Pp xvii + 175. Bristol: John Wright and Sons Ltd. Price 27s 6d.

It should be noted that Sir Henry Tidy's Synopsis of Medicine last appeared in its tenth edition over fifty ten years ago and now several of the sections of that book can be found as separate Synopses compiled by various authors. In 1963 both Cardiology, Respiratory Diseases and Gastro enterology have been produced as individual small volumes.

Although the general arrangement of the gastro-enterology synopsis follows the original style there have been extensive alterations of subject matter necessitated by the increasing knowledge of the subject in recent years. There are eleven chapters each dealing with a special part of this rapidly expanding subject and a series of very helpful figures are interspersed

in the text, highlighting the various forms of pathology and the normal aspects of peptic digestion. Heavy type and italic letters are used to emphasize important paragraphs and subdivisions in each chapter and a tradition rarely paid out the methods of pathology, clinical features, diagnosis and treatment of each specific condition. As may well be surmised the chapters on peptic ulceration (including investigational details, types of relevant operations and possible associated syndromes etc) the differentiation of the types of jejunal and the subject of ulcerative colitis are dealt with in extreme detail, with a resultant excellent up to date summary of these clinical conditions.

This synopsis on both comprehensive and accurate, and Dr. Chandler should be pleased with the contribution he has made in providing students and practitioners with the most important ideas on the diagnosis and management of problems encountered on a month with duration of duration as disease of structure. If however, every variation of medium be chosen incorporated in the Synopsis Series the rest of the pamphlet I have will prove to be extremely high.

L. G. I.

ELASTOLYSIS AND AGEING. By David A. Hall. Pp. xii + 168. Charles C. Thomas, Publisher, 301-327 East Lawrence Avenue, Springfield, Illinois. Price $8.75.

This book is a monograph on the subject of elastolysis written by a biochemist.

It is offered not only to the chemist but to the connective and pathologist with an interest in gerontology an account of certain theoretical deductions which emerge in relation to degeneration of the arteries. The book is divided into sections and deals first with the tissue component elastin, shows that this substance may have a varied importance in particular, bringing to light the role of pseudoelastin which, while imitating much of elastin's histochemical behaviour, does not have the resistance to elastolysis and may be derived from degenerate collagen. Thus may the paradox of apparent increased elastin of normal ageing tissues and their diminished resistance be explained.

Evidence is then presented for the existence of more than one enzyme in the elastolytic system deriving from secretions of the Pancreas, two principal components, elastase and elastolytoprotease, acting synergistically. It appears that these enzymes are activated by the normal tonus of the Pancreas, forcing the Islets and that appropriate amounts pass from the gut through the circulation to be absorbed on to the elastin tissue of the arteries. But they are held in check by inhibiting substances present in the tissue and surrounding tissues. The limits that these inhibitors have been noted to be reduced in arteriosclerotics and the disease results with the altering mechanism in such a fashion as to promote thrombogenesis. Then part of the basis of the theories proposed in account for the loss of vascular elasticity by the degeneration of internal fibres and the formation of thrombi at points on vessel walls in normal men with the ageing process.

I regard the finding of this book very heavy going for a relatively small reward. This is mainly because I have really been written for biochemists with an interest in this field but also because the author has a tendency to stray from the point he is trying to make and to hover all the ground by quotations from his 295 references. In any case the non-biochemist put forward in relation to ageing, do not convincingly. The clinician will not find anything in this book that he can apply to his work.

W. B. W.

MENINGIOMAS: INVOLVING THE TEMPORAL BONE. By George T. Nagel, MD. Pp. xv + 170. Illustrated. Springfield, Illinois: Charles C. Thomas, Publisher. From $5.50.

This book is found-fifth work in the American pattern on a subject which is extremely rare. As such it is of course a book of influence rather than one to be read by all.

The production of this book is an absolute masterpiece, with profuse photographs and drawings and the author is to be congratulated on his production. The amount of work which has gone into the book must have been enormous and it is an ideal guide for those embarking on the production of such a book or a thesis.

M. I. B.

PEPTIC ULCER. By T. L. Cleave, MRCP (Lond.) Pp. 160. 5 illustrations. Bristol: John Wright and Sons Ltd. Price 25s.

Peptic ulcer rates high in the list of illnesses causing great distress, discomfort, loss of work and attention. It is notoriously difficult to treat and no general agreement has been reached on routine therapy.

Surgeon Captain Cleave presents in this compact book an entirely new approach to the problem, basing his thesis on the belief that peptic ulcer is a result of civilisation, in line with natural evolution. The advances in man's knowledge and techniques especially in food preparation have far exceeded the physiological adaptation to changing circumstances.

There is a refreshing challenge in this approach and in view of the lack of success in more conventional directions physicians can have little to lose in studying the present thesis. Many will disagree with the author's theories and some of the reasoning will not stand up to statistical scrutiny.

Chapter headings give some idea of the new approach covering such subjects as The Law of Adaptation, Protein Stripping, Carbohydrate Foods, Racial Incidence. Evidence from

Prisoner-of-War Cuff[illegible] of Differences in Incidence of Gastric Ulcer and Duodenal Ulcer Appe[illegible] and the Effects of War The final chapter on summary and conclusions contains a reasoning confirming his strong belief that one should not try to be clever at Nature's expense But this is not the end for the writer seems to get a second wind and [illegible] eight little chapterlets in the form of appendices A to H which are sketchy but [illegible] thoughts of the effects of processed and unprocessed grain on gastric juice [illegible] of starch deficient obesity diabetes and appendicitis etc A word of encouragement [illegible] the over weight is the statement that wholemeal bread potatoes eaten in their skins raw fruit etc are no more fattening than any other natural food

Whether or not one accepts Captain Cleave's theories the book itself is a joy to read S M

BURNS AND THEIR TREATMENT By I K F Muir *MBE* MB MS(Lond) FRCS(Eng) and T L Barclay MB Ch B(Ed) FRCS(Ed) Pp viii+148 Many black and white plates London Lloyd Luke (Medical Books) Ltd Price 27s 6d

This excellent volume is well written in simple explicit language and with sufficient photographic plates to demonstrate important points

The author has managed to reproduce a wealth of knowledge in a book of 148 pages and the methodical arrangement of the text with useful headings and helpful summaries obviate the boredom so often experienced in reading the weighty and unwieldy phraseology of less well written volumes

The book deals sensibly with the treatment of all types of burns, emphasising the importance of dealing with the victim's general condition

Following the initial treatment the methods of restoring function and skin coverage are adequately considered

A great deal has already been written on the subject of burns and not infrequently the surfeit of theory outweighs the practical considerations a knowledge which could be lethal to the patient when granted by the inexperienced

This book is in every way practical and should prove a most useful assistant in the hands of those who don't know and in the hands of those who think they know something about burns E H M

THE STUDENT NURSE IN THE OPERATING THEATRE By Elliot E Philipp & K L Gearing *Pp* viii+62 Illustrated Edinburgh & London E & S Livingstone Ltd 7s 6d +6d postage

There is no doubt that the most important part of a nurse's training is in the Operating Theatre In this field more than any other she can afford to make no mistakes and must follow a strict routine and discipline

It is therefore of the greatest advantage for her to have such a complete little handbook as this from her earliest training

The book is easy to read and well illustrated The use of heavy print and headings is admirably arranged

It is quite the best of its kind and strongly recommended to student nurses P A M

PATHOLOGY OF THE PULMONARY VASCULATURE By C A Wagenvoort MD Donald Heath, MD PhD and Jesse E Edwards MD *Pp* xiii + 494 704 black and white Photographs and line drawings Springfield Illinois Charles S Thomas Price $25 50

The three authors whose appointments are held respectively at the Universities of Amsterdam Birmingham and Minnesota state that this Volume is not an Atlas as the text is exhaustive and they have sought to describe and discuss fully the numerous forms of Pulmonary Vascular disease However quite than half of the pages are filled with beautifully reproduced photographs of the lesions described These illustrations have been chosen from among the best that have been taken and are of outstanding clarity so that opening this volume gives immediate aesthetic pleasure

This book starts with useful chapters on the normal Pulmonary and Bronchial Vascular Systems both after the age of two years and also in foetal life and infancy It goes on to cover fully both pathological lesions and congenital abnormalities and these sections include full descriptions of the less common conditions

The writing throughout is both concise and clear and adequate space has been given to the layout of the literature This is essentially a reference work for Pathologists and Cardiologists and is a valuable addition to the library shelf P S F

VENEREAL DISEASES By Ambrose King TD MB BS(Lond) FRCS(Eng) and Claude Nicol TD MD FRCP Pp xv + 301 Illustrated London Cassell and Co Ltd Price 50s

At a time when venereal disease is becoming a major health problem and in the Services possibly the biggest single problem a book which brings together present day knowledge and experience is most welcome

Though Syphilis is less seen today it occupies a place of prominence in the book. This may be a wise intention as so many of us are tending to forget it The other classical

diseases are fully treated the high attention given to Non-Venereal Urethritis is somewhat disappointing in view of the growing significance of this infection today

The book is however generally speaking well balanced well illustrated and easy for reading and reference Use looks a bibliography It is a book for the practitioner rather than the specialist S M

THE CHEMISTRY OF DEATH By W E D Evans MD BS Pp xv 101 Springfield Illinois Charles C Thomas Publisher Price $4 75

The handling of a somewhat neglected subject such as death in such a scientific and impartial manner is indeed welcome The whole approach is based on the concept that death is not a sudden episode but a progressive change affecting different organs and systems to different degrees

In like chemical changes are all important It is right that in death the progress of these changes should be followed The cause of death must inevitably influence subsequent chemical changes and this subject is amply covered

The treatise opens with a study of the general chemical changes at post mortem followed by such special substances as the enzymes Subsequent chapters cover rigor mortis chemistry and dating inhibition of post mortem changes mummification and the effects of heat on post mortem tissues

Few doctors can fail to be impressed by this book and learn much from it S M

ANTHROPOMETRIC SURVEY OF TURKEY GREECE AND ITALY By H T E Hertzberg Edmund Cherchill C Wesley Dupertuis Robert M White and Albert Damon Pp xi + 302 Illustrated throughout Oxford Pergamon Press Price 5 guineas

This book covering a localised and special subject is in its thoroughness a typical product of the Pergamon Press Although combined essentially to anthropometric data of Turkey Greece and Italy the early chapters have much to offer in the technique of body measurement and use of such data that it should have world wide appeal to those engaged in the study of anthropometrics

It is essentially a book for the specialist and as such can be highly recommended It is furthermore a valuable book of reference S M

HEAT STRESS AND HEAT DISORDERS By G S Lethead MB ChB DTM & H and A R Lind BSc DPhil Pp xii + 304 8 plates London Cassell & Co Ltd Price 35s

A book on this subject is long overdue and no better authors than Lethead and Lind where a combination of clinical and physiological knowledge is brought together could have been chosen to write a volume which covers comprehensively this subject of growing importance.

With increased speed of travel between various climates and no increase of heat background in many circumstances in industry and the Services there is a growing awareness of the significance of heat stress and heat disorders in man Hitherto there has been a considerable amount of writing in professional Journals and the authors take advantage of this both in the fullness of their bibliography and their frequent references in the text The book is easy to read and understand and is amply illustrated It falls mainly into two parts the first being the physiological assessment by Lind and the second the clinical application by Lethead

The means whereby heat stress can be measured recorded and compared is a most important subject which is ably described The accepted indices i e the effective temperature scales wet bulb globe temperature index predicted 4 hour sweat rate and others less known are all presented without bias

This is probably one of the most important books to be written this year and it is to be widely recommended S M

We acknowledge with thanks receipt of the following publications:

Acta Medica et Balneologica Antwerp Medicina Internacional Europea Annals of Tropical Medicine and Parasitology Australian Journal of Experimental Biology and Medical Science BSI News British Medical Journal British Medical Bulletin British Journal of Surgery Bulletin de Documentation Des Armees Bulletin World Health Organisation Centro Internazionale Radio Medico Dermatological and Venereal Clinics Hospital Gazette International Review of the Army Navy and Air Force Medical Services Journal of the Royal College of Surgeons of Ireland Journal of the Irish Medical Association Journal of the Royal Army Medical Corps Journal of the R N Scientific Service La Medecina de Reserve Medical Digest Military Medicine Montreal Medical Mie Medical Journal Nagoya University Annual Report Proceedings of the Mayo Clinic R A N Medical Newsletter Revista Medica del Hospital Colonia Revista do Instituto de Medicina Tropical de Sao Paulo St Mary's Hospital Gazette Sondalinke Tidskrift Unen Aktiebolaget Soldad Militar Texas Reports on Biology and Medicine The British Journal of Surgery Tropical Diseases Bulletin Tohoku Journal of Experimental Medicine Ulster Medical Journal University of Birmingham Research Committee X Ray Focus Yokohama Medical Bulletin Yonago Acta Medica

News of the Service

OBITUARIES

Surgeon Captain Alfred Edward FLANNERY OBE LRCP & S Royal Navy died on 10th March 1964 aged 57 years

Surgeon Captain Flannery qualified LRCP & S in Dublin in 1931 and joined the Royal Navy in the same year. He served first on the China Station where he quickly established the reputation for friendly joviality and for sound diagnosing that lasted throughout his Naval career. It came as no surprise when in 1937 he was commended by the Commander in Chief Mediterranean for his great tact, firmness and efficiency in most trying circumstances when HMS *Repulse* was mined. In 1947 he was awarded the King Haakon VII Liberty Medal and in 1950 the OBE.

In 1958 he was made a medical specialist and proved his value in charge of the Families Clinic in Malta. In 1962 he became a Queen's Honorary Physician.

In 1954 came the first of his cardiac troubles and it was not until 1955 that he was again assessed as fit for full duty. He served in Malta and came greatly to love the island. On returning he settled there. Sadly he died there suddenly on 10th March, 1964. The keynotes of Alfred Flannery were his enjoyment of life and of his work and the enjoyment he gave to others.

In 1937 he married Elizabeth Maud Duffy of New York, by whom he is survived with their five children to whom we offer our sincere sympathy.

Surgeon Lieutenant Commander C R BOLAND RN (Retd) died on the 8th February 1964 at the age of 60 years.

Surgeon Lieutenant Commander Boland entered the Royal Naval Medical Service on the 24th January 1927. He was promoted to Surgeon Lieutenant Commander on 17th July 1937 and was placed on the Retired List (Medically Unfit) on 12th October 1936.

HIGHER QUALIFICATIONS

Surgeon Lieutenant Commander T P Oliver DIH July 1963

PROMOTIONS

To Surgeon Lieutenant Commander

D E Daly MB BS MRCS LRCP DA. N Lis, MB BS, MRCS LRCP, A. S Jarrett MSc MB BS, J K Fullerton MB BCh B W Fowles MB ChB, M J Mann MB BS MRCS, LRCP DA, A E Rampling, MRCS LRCP D C Beckingham MB BCh MRCOG, H B Blackstone MRCS LRCP T F Devlin MB BCh BAO C C Green MB ChB, D Obst RCOG, J M Jarrett MB BS MRCS, LRCP, D Obst RCOG DIH W Whitlow MB BS MRCS LRCP

To Surgeon Lieutenant Commander (D)

A J Chapman BDS, BDS LDS R H Hill BDS, F Robinson LDS, J W G Pidgeon BDS LDS, J A Bell BDS

NEW ENTRIES

Surgeon Lieutenant M J B Nicholson MB BS LRCP MRCS

NEW ENTRY SURGEON SUB LIEUTENANTS

R J G Soper C E Doris A H Bowen R Kingston A R Rhynie N T Kenny

TRANSFERS TO THE PERMANENT LIST

Surgeon Lieutenant Commanders H B Blackstone P D Jackson and W Whitlow
Surgeon Lieutenant A W S Brown
Surgeon Lieutenant Commander (D) J W G Pidgeon
Surgeon Lieutenant (D) G B Keeble

SHORT SERVICE COMMISSION CONVERTED TO ONE OF FIVE YEARS

Surgeon Lieutenant (D) C P Hollings

RETIREMENTS

Surgeon Captain C P Collins DSC MD DPh
Surgeon Commander W A S Grant MB ChB
Surgeon Commander (D) H C A Cruse MB ChB
Surgeon Lieutenant C J Quigley MB ChB

RELEASED ON TERMINATION OF SHORT SERVICE COMMISSION

Surgeon Lieutenant Commander J J Brand
Surgeon Lieutenant Commander R H W Park

WARDMASTERS

Promoted to Acting Wardmaster Sub Lieutenants J Evans and N L Wheeler
Retired Wardmaster Lieutenant W H D Hiles

QUEEN ALEXANDRA'S ROYAL NAVAL NURSING SERVICE

TRANSFERS TO THE PERMANENT LIST

Senior Nursing Sisters Misses J M Clarke D M Cameron E M Northway

RETIREMENTS

Miss E J McKay RRC Principal Matron
Miss M C Harvey Superintending Sister
Miss K F M Wiseman Superintending Sister

ROYAL NAVAL RESERVE

RETIREMENTS

Surgeon Commander C W Levitt *VRD*
Surgeon Lieutenant Commander (D) C J Meryon

CIVILIAN APPOINTMENTS OF RETIRED ROYAL NAVAL MEDICAL OFFICERS

Surgeon Captain Charles P Collins *DSC* to RN Aviation Defence School
Surgeon Commander J Crilley to RN Barracks Portsmouth

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SURGEON COMMANDER (D) W. E. STARKEY, OBE, RN
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L—R: Sick Berth [illegible] Spiers leading the parade [illegible] Officer Medals [illegible] HMS Pembroke 29th May, 1964

Surgeon Captain B Weston forwarded the above photograph for inclusion in the JOURNAL, with the following comments

It must be rare for a mounted sailor to lead the parade at ceremonial divisions —but for a Leading Sick Berth Attendant to do so must be unique

Spiers has for some time been a member of the RN Horse Riding team competing in Inter Service and other events- the latest being the Inter Service Jumping Competition at the Royal Windsor Horse Show for the Queen's Challenge Cup'

Editorial

Integration of the Armed Forces and particularly the close *liaison* between the Medical Branches of the three Services must inevitably give rise to some appraisal of the function and indeed the usefulness of such a publication as the JOURNAL. To be sure it belongs entirely to the subscribers in so far as it receives official sanction but no financial backing from official sources. Nevertheless the question must arise as to whether the continued effort is going to be fully justified in the future.

We believe it will be. The JOURNAL has two principal functions. First it acts as a kind of Parish magazine in providing a regular exchange of news about a group of persons scattered throughout the world who may have been friends through the greater part of their lives and do not lose interest in each other when they retire. In this respect it is a natural extension of the Royal Navy Medical Club. Second it is a forum of opinion touching upon the special medical and physiological problems confronting a maritime nation. At a time when the world's scientific literature is becoming more and more specialised it is no bad thing to maintain a periodical largely devoted to environmental problems at sea underwater physiology the hazards from scalding etc. and lately more and more urgently the ever widening field of radiobiology.

The Navy is likely to be at the fore front in the use of nuclear energy on the industrial scale as it already is with underwater exploration. It may well be that in preserving a convenient means of communication between persons who are already familiar with the background elements we shall be able to make a useful contribution not only to our own Service but to the population at large.

Articles

ONE HUNDRED AND SIXTY-FIVE DIVING ACCIDENTS

By Surgeon Captain Stanley Miles, RN

There are very few occupations or sports which do not have some hazard in fact it might be said that the hazard is one of the challenges which make the occupation worthwhile and the presence of any danger encourages care and perfection in techniques. The growing practice of diving is not without its risks and as many techniques in this field are relatively new there is still much to be learnt.

The object of this paper is to review a series of underwater accidents and see if any recommendations can be made to increase safety. Any worthwhile activity where injury or loss of life are accepted as outside possibilities should be so planned to ensure that these are kept at a minimum level. What are the accepted death and injury rates for any activity must vary considerably with the enthusiasm or profit in that particular field. Always there must be striving to reduce it and always it must be very small or the participants will be discouraged and its progress lapse.

As diving becomes established and this is certainly true of the commercial and military diving so techniques improve and the practice becomes safer. The following study of 165 accidents is taken without bias and covers without omission incidents which have been reported to the Royal Naval Medical School within the last five years. Diving organisations are of course always proud of their records of safety and reluctant to disclose their misfortunes thus some of them have not contributed to this survey. On the other hand there have been many others who realise that the more publicity that is given to accidents the more effort will be made to prevent them. Although fuller details are available these records are presented without disclosing the individual's name country or occupation. Reports have moreover been received from many parts of the world and though they may not be directly applicable to diving in this country there is a worthwhile lesson to be learnt from every one.

The accidents studied are those which may have occurred either in naval commercial or recreational diving. Incidents of Decompression Sickness involving 'Standard' (hard helmet) divers have been intentionally omitted. These have been reported in a separate paper by Slark (1962). Table I divides the cases in appropriate groups there being 45 fatal and 120 non fatal.

The difference in incidence between the fatal and non fatal cases is not as great as might be expected. The non fatal accidents owe their survival for the most part to good planning efficient safety organisation and alert comrades.

It has not been easy to place every case into tidy groups as frequently there is a combination of circumstances which makes a decision difficult. Discrepancies will however be explained as the narrative proceeds.

TABLE I

Summary of 165 Diving Accidents

Cause	Fatal	[illegible]
Asphyxia	18	6
Anoxia	8	14
Illness in water	5	10
Oxygen Poisoning	5	5
Syncope and Collapse		46
Pulmonary Barotrauma	4	4
Decompression Sickness	—	27
Shark Attack	3	
Ear Injuries	—	7
Other Causes	2	7
	45	120

ASPHYXIA

[illegible] not always been easy to separate cases of asphyxia from those of anoxia [illegible]ally speaking in asphyxia breathing has become a physical impossibility as [illegible] example with loss of a mouth piece under water Anoxia on the other hand [illegible] addition of a more gentle onset where a gradual fall of oxygen partial pressure [illegible] the lungs results in loss of consciousness Of the 18 fatal cases of asphyxia 8 lost their mouth pieces and drowned At least 4 of these were inexperienced divers who when water entered the face mask lost their mouth-pieces in attempting to expel this water and being unable to regain them drowned no doubt with some degree of panic Another was pulled off when an underwater object was fouled In 4 the life line was inadequate or absent Of the remainder there were 2 who died from inhaled vomit (In both these the post mortem showed stomachs containing exceptionally large amounts of undigested and unchewed food)

In many cases divers completely fail to appreciate the hazards of the conditions into which they are diving and may be swept away by strong tides or currents or become wedged in awkward underwater constructions or wrecks Two typical examples concern fairly expert underwater swimmers with aqua lungs exploring a tunnel leading from an underwater cave The operation was a long way from civilisation and although some reserve equipment was taken this was minimal owing to the distance it had to be carried from base As things turned out the task was much too hazardous both men being trapped in the tunnel The one single outstanding error was the use of a nylon tape as a life line which parted where it had been joined with adhesive tape!

Another disaster resulted from a diver swimming along an underground tunnel and not having the slightest idea about the endurance of his breathing set Operating alone must also be condemned as illustrated by an underwater fisherman so interested in his work that he surfaced a quarter of a mile from land worn out with adverse winds and currents and had no chance of getting ashore

Six non fatal asphyxias are alive today because in spite of their difficulties which included entanglement in underwater objects entry of water into apparatus flooding of a suit through a broken face glass faulty breathing tube connection and a painfully tight hood which pressed on the neck with change of posture—they all had life lines and stand-by divers and attendants were alert and active

ANOXIA

Anoxia cases frequently result from inexperienced use of closed or semi closed circuit breathing apparatus where the oxygen content of the breathing bag falls frequently due to cylinders becoming empty This accounted for 5 of the 9 fatal cases

The large number of deaths of spear fishermen as a result of anoxia following hyperventilation and long underwater swims have not been included in this series as these men do not use breathing apparatus One death however occurred in a diver who, as part of his training was practising free diving down to 33 ft following hyperventilation After one such dive he lost consciousness on the surface sank and disappeared Here again adequate supervision should have saved him Another experienced diver working on a towed bottom search lost his marker buoy He surfaced and was seen re tying a spare to his shoulder but was later found dead on the bottom In this instance the diver surfaced opened his mouth piece cock to atmosphere and closed his main bottles When he entered the water again he changed the breathing cock to his mixture but forgot to open the main bottles Another rather sad case occurred when a completely inexperienced diver borrowed from a friend an apparatus which was pretty well exhausted He went into the water alone while the rest of the party disappeared into a cafe for tea This was a closed circuit oxygen breathing set and the diver carried out none of the routine drill for ensuring there was oxygen in the bag He had no life line no attendants and the reserve flow was not switched on His body was found much later There can be no worse example than this of absolute failure to observe even the most elementary precautions Over and over again this is the same story gross neglect of the most obvious and simple safety precautions

In the 14 cases of anoxia in those who survived five resulted from running out of breathing mixture before the end of the swim one with a set which had been previously used and two who thinking they had just enough gas left to see the job through didn t bother to go on to their emergency supply Even in the best planned organisations gross human error occurs and there were four shocking examples three where divers entered the water with oxygen bottles filled with air and one with nitrogen These instances occur in spite of the strictest regulations about handling and labelling gas cylinders Until these mistakes can be made absolutely impossible diving with mixtures of hydrogen and oxygen cannot be considered however desirable Of the remaining cases a faulty set accounted for one and the remainder were divers practising without breathing apparatus and using the dangerous technique of hyperventilation prior to a strenuous underwater swim.

ILLNESS IN THE WATER

The underwater environment is an adverse and sometimes hostile one in which man to survive must remain alert and fit. Anything which lessens his efficiency can be disastrous. The events described so far have been accidents, but experience has shown that equally important is illness. Just as acute medical emergencies occur on land so will they occur in water where the chances of recovery are greatly lessened. The 5 fatal cases under this heading include 2 heart attacks, 2 acute virus pneumonias and 1 epilepsy. One of the heart attacks occurred during the dive and decompression sickness was suspected. He finally died whilst undergoing therapeutic recompression. The other of particular interest was a young man of 21 who felt ill in the water soon after entering with a closed circuit oxygen breathing apparatus. He collapsed whilst trying to climb out and fell back into the water (his life line was insecure and pulled away at this moment). He was found about 2 hours later on the bottom at a depth of 40 ft still breathing with his set in position and, though he regained consciousness, he died some hours later with a pulmonary haemorrhage. Post mortem examination showed complete blocking of one of his coronary arteries. His survival for so long on pure oxygen at this depth indicates the value of high pressure oxygen in coronary occlusion. The 2 cases of pneumonia described are very important. There may well be changes in the distribution of air and blood in the lungs during diving which encourage the spread of respiratory infection. Though these two patients were relatively fit before entering the water, one died before leaving it and the other some hours later in hospital, both with typical haemorrhagic pneumonias.

Four of the non fatal cases had upper respiratory tract infection which would lower resistance, particularly in an underwater swimmer with the added load of a breathing set. In many cases it is quite frightening to watch a man who has left the water in this condition. There is a very rapid onset of acute respiratory distress, occasional cyanosis, cough, pain in the chest and an X ray which shows scattered patches of dullness. Without adequate nursing, oxygen and anti-biotics these men become acutely ill.

The lesson to be emphasised here is that in no circumstances whatever should any diver with evidence of upper respiratory tract infection enter the water until he is completely cured and it might be wise to wait for a week or so even then.

The remaining non-fatal cases consisted of 3 epileptics and 3 who dived during an epidemic of gastro enteritis and complained of dizziness and nausea underwater. Two of the latter were very lucky not to vomit whilst underwater, though they did so soon after coming ashore.

OXYGEN POISONING

Although pure oxygen is not extensively used today except by naval frogmen and in cave divers it has the advantage of giving prolonged duration for the size of breathing apparatus. Its useful depth is limited to 25 ft which, especially at night, may be difficult to control. For example, of the five fatal cases recorded, one intending to swim at 40 ft gradually reached a depth of 84 where he had a

convulsion The other stories are similar, except for one who was testing a new set in which 25% oxygen was breathed After spending 11 minutes at 295 ft this diver had convulsions during his slow ascent, lost his face-piece and drowned

Some of the non-fatal cases occurred in men who were trying to see just how sensitive they were to oxygen One for example, convulsed in a pressure chamber after 31 minutes on oxygen at 65 ft Return to air usually produces rapid recovery Another had a convulsion after half an hour at 50 ft and two more at 33 ft for 37 minutes and 33 ft for 40 minutes All these are examples of the importance of keeping within the recommended limits in spite of a personal belief that one can do better Even the accepted limit of 25 ft is by no means 100 safe as for example in a diver who convulsed after 45 minutes hard swimming at 20 ft In this case the convulsion may have been aggravated by the fact that only a few hours previously he had already dived on air for 8 minutes at 120 ft Such a dive may indeed have produced some basic store of oxygen in his tissues

Whilst on the subject of oxygen poisoning although interest in this field is lessening in the diving world experience of this condition is becoming of great importance in medical practice today Hospitals are now using pressure chambers and high pressure oxygen to treat certain illnesses particularly those resulting from regional anoxia The knowledge obtained from diving is proving of value

SYNCOPE AND COLLAPSE

This is rather a hotch potch of less serious incidents It will be seen that there are no fatal cases but 40 non-fatal These include those cases where there is complete loss of consciousness in the water from one cause or another In mishaps on land little attention is paid to casual loss of consciousness and simple fainting but in water such may be a prelude to drowning Indeed statistics show that whereas on shore only one in a hundred accidents involving unconsciousness had a fatal outcome the incidence in water is one in two Thus any person who loses consciousness in the water has a 50 50 chance of drowning For this reason alone special care must be paid to this apparently simple condition Loss of consciousness is basically due to an inefficient supply of oxygen to the brain Though many conditions will produce this effect there is invariably more than one predisposing factor summation of which will produce the unconsciousness When oxygen was widely used for underwater swimming episodes of unconsciousness were relatively common particularly in men in the early stages of training who were often frightened and always apprehensive Such apprehension produces hyperventilation which by washing out carbon dioxide renders the individual most susceptible to fainting Oxygen too has also been shown to lower the syncope threshold Other factors which aggravate this and increase the chance of loss of consciousness are fatigue exhaustion hangover ill-health, alcoholic hangover increased intra pulmonary pressure and emotional stress Postural changes in water unlike those on land are not effective and there is no parallel in the underwater swimmer to the fainting seen on a parade ground on a hot day

This trouble can largely be averted by the knowledge of its existence and possible causes It is certainly very rare with air breathing apparatus though it has occurred with oxygen rich mixtures Examples which do occur are invariably associated with gross exhaustion or stress The realisation that water is an adverse environment to be approached with respect will also help Coming to terms with the environment is thus the most important single preventative factor

PULMONARY BAROTRAUMA

One of the most devastating conditions which can affect man underwater results from rupture of lung tissue liberating air into the circulation the pleural cavity or the retrosternal interstitial spaces Of these three forms of pulmonary barotrauma air embolism is by far the most serious Bubbles of air may block vessels of the cerebral or coronary circulation with rapidly fatal results In practice this may occur when the diver is ascending through the water having for some reason abandoned his breathing apparatus Unless he is relaxed and allows free escape of expanding air from the lungs an increase in intra alveolar pressure may cause the alveolar membrane to rupture Only immediate recompression can save life in severe cases It is for this reason that the various Navies of the world who practise submarine escape by free ascent in deep water tanks install recompression chambers at the water s edge This safeguard has been amply justified There is however a growing tendency amongst civilian underwater organisations to train their members in free ascent without immediate recompression facilities being available The four fatalities reported under this heading were all undergoing such training in open water from depths of 60 35 34 and 20 ft respectively In two of them no compression chambers were available and for the other two the intervals before recompression could be initiated were 13 and 20 minutes

In the four non-fatal cases reported one had an uncomplicated retrosternal emphysema which cleared up with recompression The second case, ascending from 20 ft after abandoning a faulty breathing apparatus, experienced a brief loss of consciousness but recovered with evidence of pneumothorax A third who surfaced from 30 ft was successfully recompressed The last was quite unusual in that during a 25 ft dive there was considerable difficulty in clearing the ears So much so that a considerable increase in intrapulmonary pressure resulted with possible lung damage After the dive he developed acute pain in the foot and had the good fortune to be seen by one of his country s most knowledgeable specialists in underwater medicine A diagnosis of air embolism of the dorsalis pedis artery was made and there was immediate response to pressure therapy

Accidents occurring during training in submarine escape have not been included in this series

DECOMPRESSION SICKNESS

In naval and commercial diving, decompression sickness has for many years been an accepted hazard for which routines of treatment by recompression have been evolved and accepted The introduction of the self contained breathing

apparatus has somewhat complicated the picture. The early sets produced did not contain enough air to enable the diver to remain in the water long enough at any depth to produce a risk of decompression sickness. In recent years, however, the number of cylinders used and their capacity has increased so that it is now possible in this type of diving to be exposed to the risk of decompression sickness. This is particularly true where multiple dives are undertaken. This analysis does not include cases of decompression sickness occurring in the standard (helmet) diver but is confined to those with self contained breathing apparatus or the light weight surface demand equipment.

One significant feature which underlies the increasing number of these cases in recent years is the fact that when the first 100 diving accidents of this series were tabulated a year ago there were only 6 cases of decompression sickness whereas with the present 165 there are now 27 cases.

There is a lesson to be learnt from every case and all show a failure to use accepted decompression tables properly. Many dives were excessive in both time and depth. Others were aggravated by exercise immediately after the dive or by delayed treatment. The most common mistake however was the assumption that once a bend had occurred all that was necessary would be to undergo once more the decompression schedule for the dive which had caused the bend rather than the therapeutic schedule as laid down in the special treatment tables. Multiple dives too produced ten incidents in all of which no satisfactory routine seems to have been adapted. It is indeed unfortunate that even today there are no truly satisfactory tables for multiple dives and the only safe routines are very time consuming.

Some of the more outstanding dives which have produced decompression sickness may be mentioned.

(i) Five dives to 60 and 65 ft with an average bottom time of 67 minutes for which decompression was carried out as if each was a single individual dive. This produced a severe bend and as there was no chamber nearby a helicopter flight added to the patient's distress.

(ii) Three 12 minute dives to 115 ft trying to salvage a sunken motor car. No decompression stops at all were used and a serious bend involving the central nervous system developed after a delay of 3 hours. This dive elicited a comment from the expert called in for treatment that "Such a haphazard dive deserved legal action."

(iii) Dives to 66 ft of 3½, 2¼ and 1¼ hours. The first of these would have been a good day's work but after the third when the diver had developed a "bend" he went into the water again for 30 minutes at 70 feet and 50 minutes at 40 feet. This self treatment which had little reason behind it naturally caused the decompression sickness to become very much worse and wide spread. He too had to be flown to a pressure chamber 5 hours away where he made a good recovery on adequate treatment.

These are just typical examples of failure to appreciate the importance of adequate decompression for dives. Another aggravating fact which appears from

time to time is delay in treatment when the condition is allowed to become intolerable before help is sought It is well known that the most minor cases of decompression sickness will recover with rest and conservative treatment Two cases however were reported where these minor bends became severe because the sufferers far from resting spent the evening in dance halls twisting their minor irritations into bends of some severity Such thoughtlessness not only aggravates the condition but invariably necessitates the personnel responsible for treatment being called from their beds in the early hours of the morning In one case also an individual suffering from the aches and pains of a mild flu developed bends even though using the correct diving schedule and two others developed bends in joints which had been injured during the actual dive

SHARK ATTACK

Three fatal shark attacks have been reported It is generally believed that sharks do not attack divers underwater wearing dark suits and indeed the cases reported had in fact been wearing swimming trunks alone. One of the cases was reported from the Mediterranean where the shark menace has always been regarded as non existent No witnesses were present at the incident and the evidence is entirely circumstantial There is therefore an outside possibility of the diver having been damaged by the screws of a motorboat rather than by the teeth of a shark

EAR INJURIES

Minor troubles with ears are very common and invariably due to catarrhal conditions sometimes temporary causing difficulty in clearing the ears for changes in pressure These are rarely reported and the present series includes four where the cause of the ear injury was essentially due to a badly fitting rubber hood and inefficient ear pads Two were reversed ears and one was temporary deafness following an underwater explosion

OTHER CAUSES

From time to time cases occur which do not fall into any neat classification and must be grouped together under Other Causes Of the two fatal cases one was a diver who was killed in an underwater explosion He was diving contrary to regulations and using a cutting torch which was forbidden in a compartment of a sunken ship This compartment contained trapped pockets of air and a water surface thick with oil fuel The inevitable explosion killed the diver instantly It was only subsequently suspected that the reason for his irregular diving practice was the cutting away of valuable brass from the wreck for his own profit. The other fatal accident had also some connection with an explosion in that the diver was concerned with underwater blasting losing consciousness shortly after a second dive—with paralysis of all limbs and death some weeks later The direct connection between his work and the dive is purely speculation but underwater blast injuries very often produce a delayed effect.

The seven non-fatal cases include two instances of squeeze, three attributed to carbon-dioxide poisoning, one unknown and finally a rare occasion where a diver in a submersible chamber at 1,000 feet suddenly breathed air and lost consciousness from nitrogen narcosis.

DISCUSSION

The main headings under which the various accidents have been classified are more or less the ultimate cause of the accident but of particular importance to the diver and those concerned with his welfare are the circumstances which are responsible for the final accident. A study of individual case histories makes it possible to tabulate these predisposing factors.

TABLE II

Predisposing Factors in 165 Diving Accidents

Factor	*Fatal*	*Non-fatal*
Inadequate Safety Precautions	25	—
Inadequate Training	21	95
Hazardous Diving	14	18
Failure of Apparatus	8	22
Illness in the Water	5	11
Personal Factors	2	31

INADEQUATE SAFETY PRECAUTIONS

This applies solely in this context to the ability to remove a diver from the water should he become in difficulties and implies primarily adequate supervision and attendance and the use of a life line or 'buddy' line. Absent or insecure life lines contrary to orders account for 6 of these fatalities. Absence of life line or adequate attendance was not a prime factor in non-fatal cases.

INADEQUATE TRAINING

Quite frequently the would-be diver does not appreciate the restrictions of the new environment and his enthusiasm may outweigh discretion. This plays a very big part in the causation of accidents. Failure to carry out the accepted routines which are recommended in all reputable organisations is the commonest cause of accidents. Inability to deal safely with a flooded face mask in the beginner may result in drowning. Faulty use of oxygen is another danger. Where decompression sickness has occurred inadequate treatment frequently results in severe bends. A common fault is the belief that decompression sickness can be treated with a simple diving schedule rather than the special therapeutic routines.

Training is of the greatest importance. It must be individual, patient and never rushed. The sea must be regarded as an unfriendly environment to be treated with respect at all times. There are many men excellent in other ways who are temperamentally unsuited to become divers. They should never be encouraged to do so and care should be taken to ensure that when they are released from diving training this is accompanied by no personal stigma.

HAZARDOUS DIVING

The very nature of diving must produce some degree of hazard The more experienced the diver the more ready he will be to deal with such difficulties Becoming entangled with underwater obstructions accounted for 3 of the 14 deaths and 4 were lost exploring inland underwater caves a hazardous practice at the best of times needing extreme skill and caution Injuries in the water may also occur these are likely to produce incidents of decompression sickness even if correct schedules have been used The fact that many breathing sets limit the depth and time underwater leads to a practice of surfacing to change or recharge cylinders and doing many dives during a single day This is a very frequent cause of decompression sickness and the available routines for multiple dives are so time consuming that many divers find them unacceptable Where hazards to diving are known they should be avoided and if this is impossible safety precautions and supervision should be intensified

FAILURE OF APPARATUS

Breathing apparatus is as important to the diver as the aircraft to a flier and should be maintained with the same care It may be wise to make the maintenance of the apparatus the responsibility of the diver who uses it Exhaustion of the set is the frequent cause of failure This may be due to sets being previously used without checking or lack of attention to time and pressure Occasionally apparatus has been wrongly assembled and connections have come adrift underwater Examples of human error are well illustrated in 4 cases luckily none fatal in three of which oxygen cylinders were filled with air and a fourth with nitrogen Perhaps the biggest single problem in the whole of diving is the need to eliminate human error

ILLNESS IN THE WATER

To be safe underwater demands a high degree of physical fitness and good health Circumstances may arise where the need to dive in an emergency or the reluctance to miss an opportunity may cause a person who is unfit to go underwater There is ample evidence to show that even minor degrees of sickness particularly infectious of the respiratory system do not make the individual more accident prone but are themselves worsened by the dive Attention to good health is therefore of the greatest importance

PERSONAL FACTORS

Though being primarily responsible in 2 fatal cases only personal factors are of the utmost significance Fortunately these are usually apparent during the training period when supervision is more or less absolute These individuals can then be advised or forbidden to continue with underwater activity Amongst those who remain however, there may be lapses from time to time and dives after over indulgence in alcohol following extreme exhaustion when hungry or over fed, or when suffering from some anxiety or emotional stress may produce casualties

CONCLUSION

Much can be learnt from the study of accidents which can increase the safety of diving as a whole. One single lesson which is apparent is that however tedious time consuming or irksome may be the rules and regulations in the best training manuals there is no doubt whatever that strict adherence to them will reduce the accident rate by at least 75%. Provision of adequate communication and contact with the diver is at all times essential. Personal selection is also important as is the maintenance of good health. Attention to all the conditions associated with the dive is absolutely essential.

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COMMANDO TRAINING AND ITS MEDICAL PROBLEMS

By Surgeon Commander W. R. Jack, RN

It is unfortunate that few RN Medical Officers have the opportunity of serving with RM units and the rest of us tend to remain ignorant of how a Royal Marine ticks or why our Naval soldiers are different from the Army. The essence of the modern Royal Marine as a fighting man is in fact his Commando training and the aim of this article is to explain something of the mystique of this training and to discuss the medical problems involved.

COMMANDO TRAINING

Historical

The concept of Commandos was born in 1940 after the evacuation of the Army from Dunkirk, a time of grave danger for our country. The idea formed that there should be groups of lightly equipped troops prepared to make surprise marauding raids on enemy defences and fortifications. It was at once realised that special training would be required, new types of assault boats would have to be constructed and the men needed to go on these hazardous raids would have to be specially selected.

The first Commandos to be formed were made up of volunteers from the Army. All available branches of the Army were tapped and in fact volunteers eventually came from 88 different regiments. It is important to remember that they were volunteers because from that fact stemmed the all important Commando team spirit which is the basis of their morale and remains the sheet anchor of Commandos today.

Few Royal Marines were at first involved. This was because the Royal Marine Division was at that time earmarked as a first line of defence for the possibility, ever more menacing in those days, of the invasion of Britain. When this likelihood receded in 1942, the Royals became available for Commando duty and the Corps grasped the opportunity to fulfil their primary function to provide detachments for just this type of amphibious operation. So the Royal Marine Commandos were formed, except for the first one, the Royal Marine Commandos were not formed from volunteers in the same way as the original Army Commandos. Let it better be said that the Corps as a whole volunteered. They already had the Commando team spirit backed up by nearly 300 years of loyal and gallant service. They joined in with gusto and further enhanced the glorious tradition of the Corps.

The story of the exploits of these Commando forces is well told by Hilary St George Saunders in his book 'The Green Beret'. Suffice it to say here that Commandos were engaged in 147 actions from 1940 to 1945 and their success was a vital factor in winning World War II.

At the end of the War, by which time there were 9 RM Commandos, the Army Commandos were disbanded. However, the Admiralty very rightly decided that the Royal Marines should continue to be prepared for Commando type operations.





In case a need for amphibious assault troops should arise again. As is well known this decision has been eminently justified by the fact that the green beret has been seen continuously and conspicuously on active service in one or other part of the world ever since the end of the second War which was to end all Wars.

Personnel

Thus it has arisen that today the Commando assault units are exclusively Royal Marine Commandos. It is perhaps not yet sufficiently realised that all Royal Marines now have to pass a Commando Course as part of their basic training. Failure to pass after repeated attempts can only lead to Discharge from the Service as 'Unsuitable' for further training. Unfortunately failure to pass is most likely to occur if there is some physical impediment or injuries have been sustained during training. Discharge from the Service then has to be by Survey and Invaliding.

It therefore follows that enlistment in the Royal Marines today is tantamount to volunteering for Commando service. Those of us with memories of Royal Marine Wardroom Attendants, Royal Marine printers on C in C's staff and Royal Marine drivers for VIPs might suspect that there would be still some quiet easy jobs in the Corps. However—this is not so and any Royal Marine who may be temporarily well off in some comfortable shore billet is well aware that it will only be a few months before he receives orders to return to an operational Commando where he will have to be at least as fit as when passing his basic Commando course.

Apart from the Royal Marines themselves all Naval and Army ranks who serve with the Commando also have to pass the Commando course. This means Naval Medical Officers Chaplains Instructor Officers and Sick Berth ratings Attached Army personnel are occasional REME RE Int Corps RASC RAOC and Royal Signals ranks who are destined for service with Commando Brigade Headquarters. In addition since last year two Regiments of Royal Artillery have been sent for Commando training as they will in future provide a heavier artillery support for the Royal Marine Commandos than was formerly possible

Commando Training Areas

The special training required by the wartime Commandos was carried out at Achnacarry seat of the chief of the Cameron clan near Fort William Scotland and at first lasted for 12 weeks. By 1944 a similar course had been set up at Towyn Merionethshire. After the War these courses closed down and Commando training was moved to Bickleigh on the edge of Dartmoor near Plymouth. In 1958 the Commando School moved again to its present home in the Infantry Training Centre Royal Marines at Lympstone near Exmouth in Devon. This establishment lies on the East Bank of the Estuary of the River Exe and its new buildings are an easily recognisable landmark from the windows of the Cornish Riviera express as it runs down the opposite bank. However not much of the Commando Course is carried out in these very pleasant surroundings most of the field work takes place 3 miles inland on Woodbury Common or on lonely rugged areas of Exmoor and Dartmoor

Pre Commando Course Training

The training of a Royal Marine recruit reaches its climax with the Commando Course. Before that he has had many weeks physical build up and military training

The adult entry Royal Marine recruit joins at the Depot Royal Marines Deal. Here he spends 15 weeks and learns drill and the elements of military skills. The physical build up is begun mainly by physical training of the Swedish drill type in the gymnasium. Then follows 2 weeks seamanship acquaintance carried out by living aboard a ship in the Reserve Fleet Depot Ship at Portsmouth. The physical build up is maintained during this period by circuit training. A further week is spent at the Amphibious Training Unit Royal Marines at Poole where he learns the elements of landing craft techniques and watches frogmen and swimmer canoeists at work

The recruit then joins the ITC RM at Lympstone and first of all undergoes 10 weeks of Group 'B' training. Militarily he is now taught the use of such weapons as machine guns 2 in mortars and rocket launchers. Energy and hand grenades. He also learns how to live rough in the field. Physically his build up progresses by daily 'Battle Physical Training' this is done on an 800 yd obstacle course the Assault Course set up in a field in the ITC. The obstacles include climbing over metal scaffolding small and high walls and negotiating short tunnels in the ground. The course is run against the clock and the recruit carries it out wearing fighting order (weight about 20 lb) and carrying his rifle



In the last week of Group B training there are several physical tests that he must pass These include carrying a man of his own weight 200 yds by fireman s lift climbing a 30 ft rope a 2 mile speed march and a 20 mile route march

It is thus not until his 29th week of training that the adult recruit is ready to start his Group 'C' training which is the Commando Course The Junior entry Royal Marine does similar training to the adult but his initial training at Deal is extended to eight months

It will be seen that by the time they have completed Group B training both Juniors and adult recruits have had ample opportunity to develop a high degree of physical fitness Less fortunate are the Naval and Army personnel who are drafted for Commando training They are expected to reach this stage of physical fitness after only one or at the most two weeks work up To our shame this often shows up especially the flabbiness of the average Surgeon Lieutenant

The training of 2nd Lieutenants Royal Marines also reaches a climax with the Commando Course but in their case it is 15 months before they begin it There should therefore never be any question of one of them failing to reach the required physical standard



Fig. 4 Learning how to jump

THE COMMANDO COURSE

The aim of the Commando Course is to inculcate the Commando spirit while completing the military training of the Commando soldier.

The Course takes 5 weeks and requires a great deal of stamina and endurance. Militarily the recruit learns the tactical handling of his weapons in section attacks and troop attacks. He fires live ammunition on field firing ranges, he engages in Defence and Patrol exercises involving the siting and digging of weapon slits and living in them for 48 hours. (A 2 man slit is a trench 4 ft by 2 ft and 4 ft 6 in deep. Leading from this weapon slit a shelter trench of similar dimensions is also constructed providing overhead cover.)

Progressively he is required to undertake more and more strenuous physical tasks in bogey times and his determination and guts are repeatedly stretched to their limit. Some of these physical tests may seem to bear little relation to the actual physical demands of the jungle or desert warfare. However they are designed to test every physical and mental ability or weakness of the man. Passing these tests gives a tremendous sense of achievement and builds up the recruit's self confidence through knowledge of his own capabilities.

The maintenance of morale is of supreme importance throughout the Course. A man can be as strong as an ox and yet fail because of a wrong mental approach. In particular attention is paid to

(a) Determination
(b) Enthusiasm and cheerfulness especially under bad conditions
(c) Individual initiative and self reliance
(d) Comradeship

A more detailed description of some of the physical tasks of the Commando Course follows.

Speed Marches

The Commando Course includes three speed marches, one each of 4, 6 and 9 miles carried out wearing fighting order. The speed required is 1 mile in 16 minutes, this pace is achieved by walking uphill and running when on the flat or downhill.

These speed marches test each man's fitness and stamina but they are not merely tests of individual prowess, team spirit is also required to ensure that the stragglers of the squad reach the finish in bogey time.

Endurance Course

This starts with a 2 mile scramble course laid out on undulating country in the Woodbury Common Training Area. It includes long tunnels in the ground (up to 25 yds) which show up those men with latent claustrophobia; it includes also crossing a stream and negotiating a culvert and a thigh high bog. At the end of this course the recruit takes to the road for a 4½ mile speed march back to the ITC. Teamwork is important for this course; the recruit squad is divided up into syndicates of 2 or 3 men, a weaker man often being purposely paired off with a stronger man.



Bogey for the complete course is 85 minutes but the fitter recruits often manage it in under 70 minutes. On passing the finishing post and being told his time the recruit then has to run down to a 25 yd rifle range and fire 5 rounds with his rifle if he makes a good enough score he may be granted a bonus of one minute off his time.

On completion of this course the recruit is often physically exhausted. However his clothing is probably drenched by rain or water from streams sweat and mud. He is therefore required to attend to these problems immediately a high standard of personal hygiene is insisted on but after washing his own body he must also clean all his clothing and equipment. Not least his personal weapon which is his SL rifle must once more be made immaculate.

Tarzan Course

A circuit has been set up in a small wood in the ITC with rope hazards of various types including the famous 'death slide'. From climbing up the first tree the recruit finds he has to pass from tree to tree for 120 yds at a height varying from 14–22 ft.



Fig 6. [illegible] but keep smiling.

This is an unusual challenge and the sobriquet "Tarzan Course" was inevitably attached to the circuit. It is fun to watch this course but the recruit who has any fear of heights finds it anything but fun at first. It is greatly to the credit of the Commando School instructors that they rarely fail to coax even the most frightened recruits across the rope cat walks or down the awesome death slide.

The Tarzan Course is done against the clock and is immediately followed by a run round the Battle Physical Training Assault Course. On completion the recruit is probably very tired but then has to perform the regain. This is a physical feat whereby a man hanging from a single horizontal rope swings himself up to lie on top of it. to do this successfully requires a certain knack but it is also a good test of the strength of the arm and shoulder muscles. This manoeuvre used to be practised on a horizontal rope 20 ft up between two trees with only a bunch of straw on the ground beneath. However this led to so many sprained ankles that the medical department was delighted when it was moved to a position over a static water tank: now the recruit who fails no longer risks spraining or breaking his ankle but is taught a sharp lesson by falling into 5 ft of cold water!

Once more the recruit is not yet finished. He is off straight away to fire 5 rounds on the rifle range and then to clean his body clothing equipment and rifle.

As an experiment it was decided to try a squad round the Tarzan Course after nightfall. It was expected that this would be a much greater mental strain for those who had fear of heights. In fact it was found that less vertigo was experienced when they could not see the ground and a night circuit of this course has now become a regular feature of Commando training.

Cliff Climbing

Although the hazards in the Tarzan Course may appear to be removed from what might be encountered in any conceivable military operation rope work is important for the Commando soldier as he must know how to scale a cliff. Up to four days of the Commando Course are therefore spent learning this art on Dartmoor. The recruit has to learn how to rope up and down an 80° steep cliff wearing full equipment and at speed. Furthermore this skill is tested both in the daytime and at night.

Load Carrying and Cross Country Marches

Apart from the Speed Marches already mentioned the Commando Course also includes a succession of marches carrying heavy packs. The final one of these is a 12 mile march carrying a pack weighing 75 lb. This pack includes dry spare clothing bedding ground sheet rations and ammunition – all the things the Commando soldier must carry with him to be prepared for bivouacing and fighting. This march is combined with a map reading exercise through Devon lanes and must be done under 4 hours.

The very last serial of the Commando Course is a 30 mile cross-country march wearing fighting order. The first 11 miles of this is across hilly moorland there after the course lies along roads and tracks. Teamwork is once more encouraged by dividing the squad into syndicates of 2 or 3. This is not a speed march but it has to be completed within 7 hours. When it has been accomplished the recruit

can feel that he has well and truly earned his [illegible] It be presented to him at a special parade the next day

MEDICAL PROBLEMS OF COMMANDO TRAINING

Man or Superman?

It will be seen that a high standard of physical fitness is required before the recruit starts his Commando Course If through constitutional weakness or incompletely recovered injuries he is not up to this physical standard it is better to pause and complete his physical build up before he is allowed to join a Commando Course squad

It may be suspected that the Royal Marines really need to be supermen or born athletes to be able to withstand this rigorous Course However it can be fairly stated that any man who has been enlisted in the PULHEMS medical category of P2 U2 and L2 should be capable after training of reaching the required P1 U1 and L1 standard What is required above all is stamina both physical and mental A good average physique is not enough there must be also the ability to withstand physical tiredness in bad climatic conditions and to keep laughing

Importance of Entry Medical Examination

Although super physiques are not required the physical demands of Commando training will exercise nearly every muscle and physical activity to its limit and



Fig. 7 [illegible] scale [illegible]



Fig. 8 Wearing Full Pack (75 lb.)

experience has shown that any minor constitutional weakness or deficiency will be quickly shown up and may even lead to invaliding.

For example minor degrees of pes planus or pes cavus may well not stand up to the strain of constant Battle Physical Training and speed marching—though not inevitably so. Again a history of bronchitis or mild asthma in childhood is almost bound to lead to difficulty in the Commando Course when the lungs are being tested to the limit of their function.

It follows that the initial medical examination of a potential recruit carried out by the Final Examining Medical Officer at a Careers Office or Naval Establishment must be stricter for the entry of Marine recruits than for Naval recruits. All border-line cases have to be rejected, no matter how keen the candidate appears to be.

Causes of Failure

Medical causes of failure to pass the Commando Course can be divided into those with a physical defect and those with a psychological defect but very often it is a combination of both.

Injuries are bound to happen with such a potentially hazardous Course, but, given time, expert orthopaedic treatment and adequate physiotherapy it is wonderful how many fractures, sprains and strains can be fully rehabilitated. This is subject to the proviso that the patient is determined to recover and return to his training again; however if he has a basic fear of heights and becomes an orthopaedic case from falling off a rope his recovery may be delayed interminably and the Orthopaedic Specialist may be forced into recommending his Survey and Invaliding. Many such cases have in fact recovered to the standard of P2, but will break down again on return to Commando training especially if the final steps of their rehabilitation are unduly hurried. These cases have to be invalided because they have fallen below the high physical standard required of the Royal Marines but would be acceptable in the Royal Navy or Army should they be willing to transfer.

Similarly many cases referred to the Neuro-Psychiatrist because of depression or anxiety states have begun to lose their morale following an injury which has stopped their training for a few weeks. The Psychiatrist often recognises that these are inadequate individuals who have to be invalided on psychiatric grounds although the patients would prefer to attribute their symptoms to injuries they had sustained during Commando training.

Types of Injury caused by Commando Training

Blisters. Blisters on the feet are almost universal for Naval Officers and ratings sent for Commando training because they are not used to running around in boots and it takes a few weeks to break in a new pair of SV boots anyway. Blisters are less common in the Royal Marine recruits because they have become used to their boots and, equally important, have been taught to maintain a high standard of foot hygiene. Army ranks are also very prone to blisters because although they are used to boots they are less used to running around in them and their standard of personal hygiene is often most noticeably lower than that of the Royal Marines.

Blisters and abrasions around the wrist and on the back due to the rubbing of webbing equipment are also common for all personnel

The standard treatment in the ITC for all blisters which have not become infected is soap Tinct Benz Co and adhesive strapping.

Ankle sprains The commonest injury to present to the Medical Officer is an inversion sprain of the ankle Much less common are eversion sprains Inversion sprains are caused by landing awkwardly from a fall from a rope or cliff or after jumping down from a height during the Assault Course or Endurance Course or by running over rough ground on field exercises especially at night or from more mundane causes such as slipping up when leaving the canteen or running for a bus on infrequently taken shore leaves

Routine radiological examination is carried out in all cases but even with severe sprains there is usually no bony injury demonstrable The comparative rarity of Pott's fractures is probably attributable to the wearing of boots

Treatment is usually by bed rest until the swelling has gone down and then adhesive strapping followed by physiotherapy but for severe sprains a walking POP is sometimes required

Other Injuries caused by Jumping Jumping down off high walls falling from ropes and long jumping across streams and other obstacles are orthopaedic hazards almost peculiar to Commando training There is a particular technique to be learnt whereby these manoeuvres can be accomplished without injury but unless this is quickly mastered damage to the ankles or lower legs may follow Hence commonly seen injuries are contusions of the heels sprains or tendinitis of the Achilles tendons and even strains or tears of the origins of the soleus muscles If a jump from a height finishes with the weight taken on one leg only there may follow a serious inversion sprain of the ankle a fracture of the talus or tibia or internal derangement of one knee

If fractures of leg bones do occur they lead to a prolonged suspension of the recruit's training The normal processes of bony union callus resorption and remoulding of the bones have to be quite complete before return to strenuous training can be contemplated It is very difficult for the keen recruit to accept this long period of waiting with patience. Not only does he get back classed he sees all his friends in his squad going ahead with their training and winning the coveted green beret followed by being drafted out to an operational Commando In extreme cases he may even see his friends return to the ITC after a year's commission at Aden. while he is still pottering about on Light Duties It is easy to understand why such cases tend to lose morale

Other Orthopaedic cases seen Rupture of the long head of the rectus femoris, dislocation of the patellae adductor strains and strains of the rectus abdominis are occasionally seen Less commonly there are sprains of the wrist from falls on the outstretched hands or classical fractures of the carpal scaphoid

Inadequately treated dislocations of the shoulder prior to entry are surprisingly common The strains of the Commando Course on the shoulder then often lead to further rupture of the shoulder capsule and recurrent subluxation requiring surgical repair

Not [redacted] tendinous insertions of the tibialis anterior or peroneal muscle tendons or of the extensor pollicis longus tendons due to faulty rope climbing technique Treatment by rest and strapping suffices

Of bursae affected the prepatellar bursa is very commonly contused when scrambling up and down cliffs and may become infected due to overlying abrasion

Even minor degrees of lumbar disc syndrome or sacro iliac strain are found to be poor risks for Commando training because of the recovery of a back sufficient to withstand the strain of load carrying marches and fireman's lift will take an unacceptably long time

Stress Fractures As might be expected march fractures of the metatarsals occur quite commonly occasionally they recur in the same man in a different bone at a later stage of training Although they all recover after rest and immobilisation by strapping or POP the recruit cannot be returned to Commando training until healing is complete both clinically and radiologically or refracture through the callus will occur Unfortunately this may take as long as 5 months

Less common stress fractures are also sometimes seen e g through tibia or fibula and recently a stress fracture of a metacarpal has been seen in a cliff climbing instructor The following case deserves special mention

> *Case 1* Marine M aged 19 developed a pain in his left thigh while going round the Endurance Course in his final week of the Commando Course He did not report sick the next day lest the Medical Officer should prevent him from trying his very last physical task—the 30 mile cross country march He did indeed try this march the next day but found the going hard and after a few miles over rough country fell down and was unable to stand up again On being brought back to the Sick Bay he was found to have sustained a complete transverse midshaft fracture of the femur with overriding of the bone ends With no history of direct trauma this must be classed as a type of stress fracture
>
> It is nice to be able to record that he was judged to have proved himself to have the guts required of a Commando and he was awarded his green beret forthwith

Exhaustion and Collapse

As has been stated the Commando Course will test the endurance of the hardiest recruit and the least fit or least willing in a squad may be driven to the point of exhaustion All types of physical or psychogenic collapse may be seen and it may be difficult for a young NCO in charge of a squad to keep an eye on each man and to judge when each has had enough and has reached the stage of impending collapse Obviously the known weak members of a squad will be watched more closely and greater vigilance will be exercised during the more strenuous physical tasks But even the fittest athlete may collapse during a simple 4 mile speed march if he happens to be brewing up an acute influenzal attack

Cases of collapse on speed marches occur quite frequently in the summer months but only in special circumstances in cold weather This fact provides the clue to their pathogenesis they are commonly due to heat exhaustion To guard

[illegible]inst this factor it is the rule that each recruit must [illegible] salt tablets with adequate water before starting a speed march or load carry[illegible] march In spite of this cases still occur and each speed march is followed by a safety vehicle such as a ¼ ton Land Rover carrying a Sick Berth rating whose job it is to collect any men who have collapsed or are on the verge of collapse

Cases of this heat exhaustion type of collapse are brought back to the Sick Bay and put to bed They often show a rise of temperature up to 101°F with a fast pulse and profuse sweating They may be mentally disorientated and amnesic The urine may show a trace or cloud of albumen Routine treatment is rest and glucose drinks plus salt and recovery is usually complete after 1–2 hours

However salt and water are not the only answer and an unfit man can easily collapse without having run out of salt or become too dehydrated One common reason for collapse is that the near exhausted man tends to hyper ventilate leading to a physiological syncope This is probably the reason for collapse in cases where unfit men black out and fall down after having run only 1 or 2 miles The art of correct breathing is in fact as important but as difficult to learn in speed marching as it is in competition swimming

The following cases illustrate two extreme types of exhaustion

Case 2 Marine S was an average member of his squad On 31st May 1963 the dawn at Lympstone was delightful the sun rose into a cloudless sky and there was not a breath of wind in fact it appeared that we were due for at least one hot summer's day in that year By noon we were sure of it it was sweltering

At 0600 that morning a Commando Course squad in its final week embarked in 3 ton trucks which then took them to the start of their 30 mile cross-country march Kick off was at 0800 and by that time they knew they were in for a warm run which would have been fairly reasonable in shorts and vest but which was going to be unpleasant wearing fighting order

In fact the whole squad did fairly well and by 1430 many had finished Only one man Marine S, failed he collapsed unconscious 200 yds from the finishing post

The patient was brought back to the Sick Bay for treatment and on arrival his temperature was recorded as subnormal However the temperature rose swiftly and within half an-hour was 106·2 F and it was realised that this was a true case of heat stroke Intravenous infusion of 1 pint of saline followed by 1 pint of glucose saline and cold sponging was ordered Consciousness returned after 14 hours and he was rational although amnesic after 4 hours

Investigation showed that he had had no breakfast and had omitted to take salt tablets before starting the march

Case 3 Date November 1963 Time the early hours Place the moors near Okehampton The occasion a squad of young Royal Marine Officers and some ranks of 41 Commando were engaged in a night exercise in the field which involved long marches through rough country in cold misty drizzly weather—although it was not cold enough for snow

At 0300 an officer conducting one phase of the exercise returned to base camp near Okehampton and reported that one 2nd Lieutenant and one Marine had collapsed unconscious from exhaustion some hours previously and had had to be left where they were in remote inaccessible places on the moor

A Medical Officer and ambulance were requested from the ITC Lympstone, as local help was not forthcoming However the mist increased in density and having reached the base camp the ambulance found it could go little further Search parties were sent out before dawn with the hope of finding the casualties and carrying them back to the ambulance waiting on the edge of the moor and the Medical Officer waited with mounting apprehension

In fact this tale has a happy ending because the officer who was conducting this part of the exercise was a very competent experienced officer who knew the best treatment for exposure he had arranged as much shelter as he could improvise with groundsheets and he had left fitter comrades to lie adjacent to them and conserve their body heat and had supplied a thermos flask of hot coffee and a flask of spirits to revive them when consciousness returned The result was ideal the search parties were unable to find them because thanks to these measures the casualties recovered from their exhaustion and awoke at dawn and were able to carry on with the exercise as if nothing had happened

Psychiatric Failures

Mention has been made earlier of the loss of morale that commonly follows prolonged interruption of training due to injury or illness In amplification it should be explained that the team spirit which will knit together the formed Commando is encouraged from the beginning of training by fostering squad spirit By the time a squad arrives at ITC Lympstone this spirit is usually well developed In the case of a Junior entry squad who have been together for at least 8 months it is often very marked This is as it should be the gregariousness of human nature is a basic instinct and the yearning for comradeship is often the primary reason for enlistment Properly encouraged and directed this spirit will stand them in good stead when conditions are bad and the instinct of self-preservation might otherwise take precedence over the herd instinct

In this perspective it will be appreciated that to be back squadded is a sad blow to befall the average keen young recruit The fear of being back-squadded actually leads to many a recruit failing to report sick when there are obvious grounds for him to do so

Against this background of a squad of fit young men striving to achieve a standard of physical perfection and military efficiency together there will obviously be the odd man who cannot keep up with the rest and who realises he has joined the wrong mob

This is often because recruiting material includes those psychologically immature teenagers who are unsatisfied with civilian employment and dissatisfied with their home life and with every aspect of life as they know it such young men may join the Marines to prove their manhood attracted by the glamour of Commando

explains but basically medicable to the standard of toughness and emotional stability required.

One would hope that such misfits were recognised early. Some are and are invalided or discharged. Unsuitable by the Depot at Deal. However some of them survive Deal because their physical and mental stamina is not really tested until they start to endure the stresses of Commando training.

One fairly common manifestation of psychosomatic disease seen is the recruit complaining of pain in his chest on doubling. In some of these cases there may well be a history of chest infection a pneumonitis or even basal pneumonia and it is reasonable to believe that such cases will experience pain in the chest after exercise for some months after the infection. However there is often no clearly defined history of heart or lung disease in one parent. If no symptomatic improvement occurs spontaneously or after graduated exercise the Medical Specialist may be forced to invalid these cases with the label of Effort Syndrome.

That all cases of chest pain do not necessarily lead to invaliding is well illustrated by the following case.

Case 4. On 10th May 1962 a squad of Junior Marines recently arrived from Deal gave a display in front of the general public at the Royal Devon Show. The display included a bayonet charge on dummies in order to make the spectacle more amusing it was decided that two of the dummies should actually be live Marines who were to jump up and run away on the approach of the charging squad. Unfortunately the joke misfired and one of the live dummies, J/Mne H., was bayoneted as he lay on the ground. The entry wound was a 1 in. horizontal laceration below the lateral to the angle of the right scapula and the exit wound was a ¼ in. laceration below the right sterno clavicular joint. The injured man was immediately taken by ambulance to the Royal Devon and Exeter Hospital for observation and treatment. The remarkable feature of the case was that in spite of the potential severity of the wound very little internal damage was sustained. there was a fracture of the 7th rib and surgical emphysema developed around the entry wound. but repeated X-rays showed no more than a possible thin pneumothorax at the apex and raising of the right diaphragm by 1 in. He was retained in hospital for 3 weeks until the possibility of secondary haemorrhage could be ruled out and then transferred to the Sick Bay ITC for another 10 days further observation. Not surprisingly he did complain of some aching pain in the chest after this but otherwise seemed quite fit and was anxious to press on with his Group B training. However it seemed prudent to delay his return to training for a few months. In fact he was returned to full training in August and passed his Commando Course without difficulty in November 1962.

SUMMARY AND COMMENT

An attempt has been made to describe the physical and mental stresses involved in Commando training. The medical reasons for failure to pass the Commando Course have been explained and it will be appreciated that the high standard

required [illegible] rate of invaliding compared with other branches [illegible] Any question of lowering this standard must be anathema to the Royal Marines and would not be supported by any Medical Officer who has served with the Corps

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ATTEMPTED SUICIDE

By Surgeon Commander G G Wallis RN

In a recent eight month period 31 in a total of 305 Royal Navy [illegible] patients were admitted to the Royal Victoria Hospital Netley on account of suicidal attempts Breakdown of the 31 patients by age marital status British method (23 used drugs) diagnosis and disposal (12 to duty and 19 invalided) reveal no correlation between any of these variables

During this time some eight suicidal attempters were seen as out patients by Neuro Psychiatrists in the Portsmouth Command and were kept at duty so that the Naval incidence of attempted suicide in this small series tallies closely with the total of 60 per year—11 per cent of psychiatric admission to hospital—found in the Royal Navy by Cullen (1960) in the years 1954 to 1958 The incidence of 60 per 100 000 (the approximate strength of the Royal Navy) is of the same order as estimates for attempted suicide in the civilian population (Stengel 1960)

When confronted with a rating who has attempted suicide a Medical Officer s policy will be guided mainly by the possibility of real suicide Disregarding all clinical and theoretical considerations of suicidal attempts what are the actuarial prospects of such a tragedy?

Some answer to this question may be found firstly by comparing the rates for suicide with those for attempted suicide We then find that the suicide rate in this country is a little more than 10 per 100 000 or 5 000 a year in England and Wales (*British Medical Journal* 1956) (roughly the same as deaths from road accidents) and that there are at least 6 or 7 times as many attempts (Stengel 1960) The ratio in parts of the USA has been estimated at six to one (New York Metropolitan Life Insurance Company 1941) and in Cullen s (1960) study there were nearly nine attempts to every one suicide in the Royal Navy

Secondly follow up studies of several samples of attempters show that only a few 1 to 6 per cent killed themselves within the following 5 to 10 years (Dahlgren 1945 *British Medical Journal* 1956 Stengel and Cook 1958) Of 315 naval attempters Cullen (1960) found that one later killed himself although since he reported one more has done so and he has discovered another one not in that series who committed suicide after attempting it

Thirdly by retrospective enquiry into the histories of people who had killed themselves Sainsbury (1955) found that 9 per cent Stengel and Cook (1958) 14 per cent and Cullen (1960) 6 per cent had at some time attempted suicide

Thus the statistical relation of attempted to actual suicide is remote Moreover a brief look at some epidemiological aspects shows striking differences between the two events Attempts as opposed to suicides are more frequent in the younger age groups (Stengel 1960 Cullen 1960) There is a higher proportion of women among attempted than consummated suicides (Stengel 1960) attempts compared with suicides are over presented in Social Class V (Registrar General 1951) (Batchelor 1954) and among people who are maladjusted and unsuccessful (Cullen

1950); attempts come more often in the day, suicides at night or in the early morning (Murphy 1954); and attempters choose drugs as their method far more often than those who kill themselves (Stengel and Cook, 1958; Cullen, 1960).

The follow up study of Dahlgren (1945) suggests that the diagnosis, whether psychosis, neurosis or personality disorder, does not help in assessing the risk of real suicide. Although the attempters and the self-killers come from different populations, there is a slight overlap between them and the danger of ultimate suicide is somewhat greater in a person who has once attempted suicide than in one who has not.

Although Curran (1963) has pointed out another aspect of this overlap—that as a result of improved physical treatment many attempters who would have died a few years ago are now saved—attempts often appear so feeble that they hardly merit the use of this term and are better described as suicidal "behaviour". The author recalls the officer who, being in all kinds of trouble, entered the sea at Marseilles but on meeting a shoal of jellyfish struck back for the shore because the will to live returned. McGhie (1963) has stated that 80 per cent of Army personnel behaving suicidally are not admitted to hospital, although many of them are invalided as out-patients; others are treated in medical units at depots and yet others are detained for two days or less in Army hospitals but not shown as admissions thereto.

The method of self-trauma and the degree of danger and intent are poor clues to the diagnosis and to talk of suicidal behaviour as "genuine" or "not genuine" is to confuse all the circumstances and parameters and is therefore virtually meaningless. Even an apparently weak gesture always signifies an emotional disturbance possibly a serious psychotic one which requires some action, whether medical, disciplinary or welfare. Severe depression and agitation before the attempt are usually relieved by the emotional catharsis of self-trauma so that the gravity of the underlying disorder may be missed. Most in need of medical treatment are typically the young schizophrenic rating and the middle-aged depressive officer. Schneider's (1954) follow-up investigation confirms general psychiatric experience that the majority of attempters continue to be a medical concern, partly because they so often repeat their attempts. 35 of Cullen's (1960) 315 attempters repeated the suicidal behaviour at least once.

Pozner (1953) has drawn attention to a concealed form of suicidal behaviour which appears as recklessness in enemy action, in parachute jumping, in recreations such as hunting, in driving on the roads, in drinking alcohol and in neglect of medical advice among those with physical illnesses such as pulmonary tuberculosis. Likewise Carmichael (1943) believes that drug addiction and gambling are substitutes for suicide and that war is mass suicide.

The psychopathology of the suicidal act has at least three components. It is a gamble with life, death and a new beginning (Stengel 1952, 1960) and especially a theatrical appeal for help or alteration of circumstances. Stengel (1960) has said the suicidal attempt acts as an alarm signal and as an inarticulate and unspecified appeal for help in distress, or as Stransz (1956) put it, it is as though the patient

was saying in s[illegible] I am lonely I am ill I am ill treated [illegible] normal life is impossible you must do something about it Thirdly the act seeks to arouse in those close to the person the sympathy affection regret and feelings of guilt which he imagines they would feel were he to die This set of fantasies cannot to my mind be expressed with more poignant humour than by Jud Fry contemplating suicidal behaviour in Oklahoma

Poor Jud is dead
Poor Jud Fry is dead
Oh gather round his coffin now and cry
He had a heart of gold
And he wasn't very old
Oh why did such a feller have to die?
Poor Jud is dead
Poor Jud Fry is dead
He's looking oh so peaceful and serene
He's all laid out to rest
With his hand across his chest
His finger nails have never been so clean
And then the preacher get and he'd say
Folks we're gathered here to mourn and groan over our brother Jud Fry
Who hung himself up by a rope in a smoke house
Then there'd be weeping and wailing from some of those women
And then he'd say Jud was the most misunderstood man in this territory
People used to think he was a mean ugly feller and call him a dirty skunk an ordinary pig stealer
But the folks who really knowed him knowed that beneath those two dirty shirts he always wore
There beat a heart as big as all out doors
Jud Fry loved his fellow men
He loved the birds of the forests and the beasts of the field
He loved the mice and the vermin in the barn
And he treated the rats like equals
That's right
He loved all little children
He loved everything and everybody in the world
Only he never let on
So nobody ever knowed it
Poor Jud is dead
Poor Jud Fry is dead
His friends will weep and wail for miles around
The daisies in the dell
Will give out a different smell
Because poor Jud is underneath the ground
Poor Jud is dead

A candle lights his head
He's laying in a coffin made o' wood
And folks are feeling sad,
'Cos they used to treat him bad
And now they know their friend has gone for good
Poor Jud is dead.
A candle lights his head
He's looking oh so purty and so nice,
He looks like he's asleep
It's a shame that he won't keep
But it's summer and we're runnin' out of ice
Poor Jud! Poor Jud!

ACKNOWLEDGMENTS

I am grateful to Surgeon Rear Admiral J M Hulford OBE QHP FRCP Medical Officer-in-Charge Royal Naval Hospital Haslar and to Colonel R G Davies T/RAMC Officer Commanding Royal Victoria Hospital Netley for permission to publish this article

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RADIOLOGICAL PROTECTION IN PEACETIME

(Part One)

By Surgeon Commander C. O Le C Hughes, RN

Legal Aspects

It is a requirement in Common Law in the United Kingdom that the user of any source of ionizing radiation must ensure that no hurt or harm can come to any person as a result of his activities This general provision is further strengthened by the numerous Acts Regulations and Orders which have been issued in recent times These statutory instruments which are listed in the bibliography specify the physical condition under which sources of ionizing radiation may be used stored or disposed of the physical measures to be taken to control and measure the degree of an individual's exposure to these radiations and the type of medical surveillance required They also prescribe where appropriate the measures to be taken to protect members of the general public

There are however other equally important reasons for providing adequate measures to protect persons from the effects of irradiation and radioactive contamination all of which must be considered as being potentially harmful even at very low rates of exposure

Political and Moral Requirements

It is inevitable that the attitude of a great number of people nowadays to the problems associated with the use of ionizing radiation should be emotionally highly charged It requires only a minor initial misinterpretation or misinformed public comment to provoke a disproportionate amount of adverse publicity Nuclear Science and Technology has no firmly established conscience of its own However comprehensive the Regulations and Instructions may be the extensive variety of types and conditions of persons involved in work of this nature make it impossible to assume that any consistently reliable sense of responsibility exists at all levels

For these reasons a policy for ensuring that working condition and procedures are safer than safe is generally accepted however irksome this may be to many of the experts How far it is justifiable to extend or relax these safety measures or how far it is possible to state for any given circumstance when safer than safe becomes too safe are questions at all times difficult (and sometimes impossible) to answer

Health Physics

The profession of Health Physics provides suitably trained and equipped personnel to aid in the protection against the potential hazards of ionizing radiations whilst allowing the benefits derived from nuclear energy to be enjoyed Health Physics as an entity was born about 1942 within the Plutonium Project in the USA in order to distinguish it from 'Health Medicine' which was concerned with factory doctoring It is now recognised internationally as meaning the science or profession of radiation hazard control in all its aspects

Duties of the Health Physicist

Charged with the task of providing protection against the real and potential hazards of ionizing radiation from whatever source the health physicist must have a working knowledge of many academic disciplines His competence therefore depends upon his possessing a high degree of erudition based on a wide variety of specialist subjects His duties are skilled important and unique They are

(1) to develop sound philosophy and principles for radiological protection
(2) to apply these to practical situations (in design, experiments industrial processes storage waste disposal etc)
(3) to devise methods and techniques for monitoring and dosimetry and instruments for use in carrying them out

He carries out these tasks as part of a programme which must be economically feasible for ensuring the safety of both workers and the public Less technical but nevertheless integral parts of this programme involve him in

(4) giving advice and assistance to established authorities in the fields of environmental hygiene and public health
(5) assisting in the education of workers and the general public
(6) assisting in defence and emergency planning

Organisation of a Protection Programme

Whatever the real or potential degree of hazard concerned with a given procedure an appropriate radiological health and safety programme must be drawn up In the case of minor hazards the health physicist may only be involved in providing advice in the initial stages and in continuing to assist at a distance thereafter if however the hazards concerned with the process are significant then it will be the task of a professional health physicist to draw up and implement such a programme under his continuous surveillance

The steps taken will always include the need to

(i) **Establish standards of maximum permissible levels of exposure.** These standards are essential They form the basis of the design of installations and of the criteria on which operating procedures are drawn up consistent with an acceptable risk to the health of any who might be involved International standards have been promulgated through the recommendations of the International Commission for Radiological Protection (ICRP) and its specialist Committees For the United Kingdom the Medical Research Council provides complimentary recommendations (some of which have in turn been endorsed by ICRP) Any special limits peculiar to a given process will be derived with reference to these basic standards of Maximum Permissible Dose (MPD) and Maximum Permissible Concentration (MPC) The special limits e g for contamination are referred to nowadays as Derived Working Levels or Limits (DWLs)

(ii) **Design the installations in which, or devices by which sources of ionizing radiations are used** Inherent safety may be expensive and add considerably to the initial cost of a project (anything from 20 per cent to 70 per cent of the cost of a reactor installation is taken up by the provision of

safeguards) but where this can be provided it will eventually prove to be the most reliable and economic means of providing adequate protection

(iii) **Supplement the protection afforded by safeguards by adequate training** This training is properly conducted through attendance at courses and by working under the close supervision of a qualified expert Only in this way is it possible to instill in the operator a knowledge of the hazards involved provide him with the necessary skills and develop in him the conscientious use of protective devices

(iv) **Establish well defined operating procedures.** Personnel involved should be provided with a copy of these if necessary

(v) **Supply appropriate equipment and trained staff to operate it.** The equipment instruments and personnel are necessary to implement the operating procedures and maintain the necessary supporting facilities

(vi) **Maintain good discipline.** Lines of responsibility for radiological safety should be drawn very clearly All personnel must be fully aware of their duties and responsibilities

(vii) **Draw up emergency procedures,** and provide appropriate facilities for carrying them out

(viii) **Establish secure liaison with external agencies**

(ix) **Maintain cumulative radiation exposure records.** These records must cover doses obtained from sources external to body from external bodily contamination from radio nuclides within the body and must include records of exposure of parts of the body or specific organs The record system should be designed to cover not only the total period of exposure but be arranged to provide exposure data for periods of thirteen weeks or less to ensure adequate short term control

(x) **To establish a system of follow-up** This including inspection is most suitably controlled by a central authority responsible for overseeing the whole programme It is necessary as being the only effective means of ensuring that the organisation is working effectively and that exposures are being kept at the lowest practicable level

(to be continued)

Clinical Notes and Cases

GHOST TEETH OR ODONTO DYSPLASIA

By Surgeon Captain (D) D. L. Goodridge, RN

Two recent reports have described dental malformations in which the X-ray [illegible] abnormal teeth appeared on the negative as ghost like shadows of normal [illegible] (Berenholtz Lysell and Pindborg 1963 and Zengarelli Kutscher Applebaum and Archard 1963). A case was seen recently which repeated these findings exactly. It is reported here because of its rarity and also because this is the first history of this anomaly occurring across the mid-line.

Case Report

B.J. aged 7—a well grown intelligent girl of elderly parents was referred by an RAF Dental Officer on 3rd October 1963.

On examination she presented $\frac{6\,e\,d}{6\,e\,d\,c\,2\,1}\,\Big|\,\frac{a\,c\,d\,e\,6}{1\,c\,d\,e\,6}\,\frac{a}{}$ had been lost early and $\frac{e\,b}{}$ extracted because of a chronic sinus one year previously. $\frac{}{b\,a}\,\Big|\,\frac{b}{a\,b}$ had been shed normally. $\Big|\frac{2}{2}$ were erupting. There was a tendency to Class III relationship.

Physically the girl was normal. Her overweight of 7 stone was due to dietary excess rather than to endocrinal disturbances. She was the third child of parents in their forties and went on to Intl term. She was a forceps delivery and her mother had a mild degree of blood pressure at the end of pregnancy. She had had no serious childhood diseases. X-rays showed abnormal development of $\frac{321\,|\,1}{}$ (Figs. 1, 2). The teeth showed extreme radiotranslucency with little shape or form. There were small patches of opacity in the consistency of the enamel. The roots were shortened $\frac{|\,2}{}$ and other teeth appeared to be normal in shape and position.

It seemed obvious that normal growth or eruption of $\frac{321\,|\,1}{}$ could not occur. So, after consultation with her previous orthodontic consultant and with the Consultant in Dental Pathology to the Royal Navy, it was recommended that the abnormal teeth and dental crypts should be excised surgically.

On 7th November 1963 under intranasal intubration anaesthesia the crypts were exposed by raising a U flap stretching from $\frac{d}{}$ to $\frac{2}{}$. The teeth and crypts were divided from the alveolar bone by chisel and sent for biopsy. The wound was closed with 4 sutures.

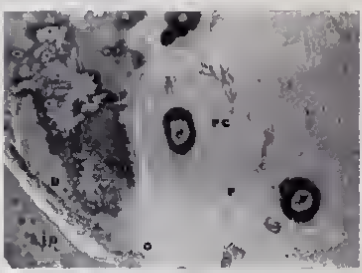
Recovery was uncomplicated. Ten days later impressions were taken and the girl fitted with a partial upper denture simulating the stage of eruption normal

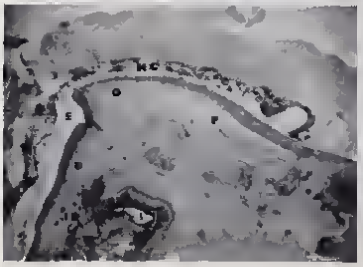


Fig. 1
X-ray showing aberrant development and extreme odontotranslucency of right upper canine, incisors and left upper central




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in a seven year old with a finger spring on $\frac{|2}{}$ to bring it upright. Three months later, $\frac{|2}{}$ was in good position and a further prosthesis was made simulating later eruption of $\frac{21|1}{}$. Care was being taken to guard against a potential mandibular protrusion which, because of her maxillary deficiency, the child had been developing previously.

Microscopic Pathology

Decalcified sections of the teeth were made and cut diagonally (Figs. 3, 4, 5, 6 and 7).

Pulp. The pulp was vital with normal blood vessels and matrix. A layer of flattened odontoblasts was seen (Figs. 4 and 7). There were also several calcified bodies of odontoid tissue (Figs. 3 and 4) and invaginations of abnormal dentine.

Dentine. The dentine was thinner than usual and consisted of two distinct varieties. There were large areas of interglobular dentine (Fig. 3) interspersed with more normal dentine. In the invaginations there were areas which were heavily basophilic, amorphous and granular (Fig. 6).

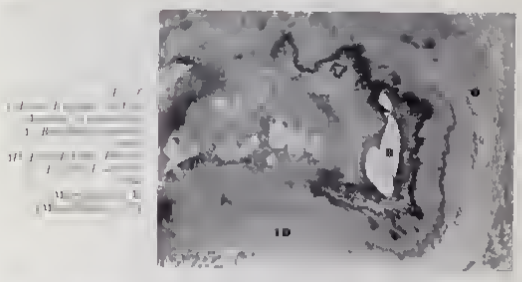
Enamel Matrix. The decalcified remnants of the enamel organ were seen (Fig. 5). The enamel matrix had been irregularly calcified (Fig. 7).

Connective Tissue. The connective tissue had included small calcified islands (Fig. 7). There were also whirl like arrangements of connective tissue as described by Bergman *et al.* (1963). They lie at the top right-hand corner of Fig. 7, but are not easily identified in the photomicrographs.

Discussion

No satisfactory explanation has been given for these kind of localised deficiencies in tooth structure. The basic dental form is present but all structures appear to have lost direction in development and show abnormalities. The enamel is hypoplastic and macroscopically gives a 'cauliflower' appearance. The dentine is distorted and shows interglobular dentine with marked irregularities occurring in layers. The pulp has calcified bodies within its substance. The total size of the teeth is small and the apical development is delayed. Within the enamel matrix there are calcified remnants of the enamel organ.

All these anomalies indicate that there has been damage to the odontogenic epithelium. But how and when the damage took place is less easy to hypothesise. The calcification of the tip of the crowns of the upper central incisors can be assumed to have started at three to four months, the tips of a lateral incisor or canine would be 4–6 months later. Thus the suggestion of trauma by a birth injury seems likely to be invalidated by the fact that similar damage has occurred in three teeth which were at different stages of growth at birth. Other explanations that have been suggested for the cause of the damage are equally unlikely to be correct. Zegarelli *et al.* (1963) besides trauma postulated hyperpyrexia, radiation, genetic influences and metabolic deficiencies. But as Bergman *et al.* (1963) pointed out, the interference with normal growth must have been continuously active over the whole of the period of development.



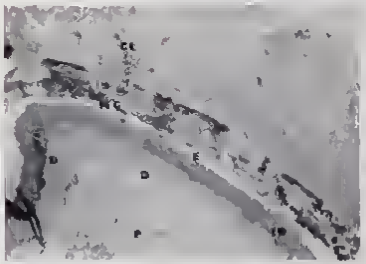


Fig. 7
Odontogenic dysplasia. Note (MC) the retention of the enamel matrix and (D) the calcified strands within the intercellular matrix (Mallory, ×375)

We must therefore accept the hypothesis that there was spontaneous alteration in the odontogenic layers occurring before birth which caused a profound and prolonged interference to the normal growth and development of the four affected teeth.

Summary

A case is presented of abnormal development of $\frac{321 \mid 1}{}$ in a child of seven by an idiopathic alteration in the odontogenic layers occurring during foetal life. Photomicrographs are shown of the condition in which calcified deposits are seen in the enamel matrix accompanied by abnormal interglobular dentine. X rays give the appearance of ghost teeth.

ACKNOWLEDGMENTS

I wish to acknowledge the kindness of Mr P H Burke Consultant Dental Surgeon at Addenbrookes Hospital Cambridge for his interest and for granting me permission to publish this case which we jointly wish to thank Professor M Knighton Consultant in Dental Pathology to the Royal Navy for his help and kind permission to use the excellent slide produced at the Department of Dental Medicine at Guy's Hospital and my thanks are also due to Surgeon Vice Admiral Sir Derek Steele Perkins KCVO CB QHS for permission to publish this article

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SEVEN TUMOURS IN THE LIVER*

By Surgeon Commander D O Haines, RN

During the eighteen months from September 1962 to March 1964 in sixteen out of a total of sixty necropsies at RN Hospital Plymouth the liver contained neoplasm and seven of these patients are described and discussed because of their unusual or illustrative features

Case Histories All the patients except No 3 were civilian males from the Plymouth area

Case No 1 I D aged 67

This man died suddenly at work in the Dockyard

At necropsy acute coronary occlusion was found but additionally the liver was seen to be studded with hundreds of grey lentil sized tumours mainly close to the capsule Histological section showed them to be biliary adenomata or 'hamartomas' i e not true tumours possibly representing a minor form of congenital cystic disease) There were a few congenital cysts in each kidney but these are not necessarily related As the liver was otherwise normal it seems unlikely that any symptoms would have arisen from these tumours but their presence would have posed a serious problem had this patient ever submitted to laparotomy for any reason

Case No 2 R F I aged 68

This patient did come to laparotomy after 24 hours acute abdominal pain with a past history of dyspepsia Provisional diagnosis was of mesenteric thrombosis but at operation there was blood in the peritoneal cavity issuing from a fungating tumour of the right lobe of the liver Muscle was stitched over the bleeding points Limited inspection showed no evidence of tumour elsewhere He died two days later and at post mortem the abnormal findings were limited to the liver which showed portal cirrhosis with many nodules of hepatocarcinoma two of which had eroded the capsule and bled into the peritoneum Histologically the tumours were trabeculated liver cell carcinoma (Fig 1) This type of carcinoma is a well recognised complication of cirrhosis (Fig 2) In this case the onset of fungation and haemorrhage was rapidly fatal in a patient who had no sign of hepatic failure nor of portal hypertension the most usual cause of haemorrhage in this disease

Case No 3 M Y L aged 49

This Chinese seaman had been ill with abdominal pain and anorexia during a passage from the West Indies A diagnosis of cholecystitis had been made by the radio adviser He died in collapse a few hours before the ship arrived in Plymouth At necropsy the muscles and viscera were strikingly pale and 3,100 mls of blood were evacuated from the peritoneal cavity The whole of the right lobe of the liver

* Adapted from a paper read at Joint Clinical Meeting with Plymouth Medical Society RN Hospital Plymouth February 1964

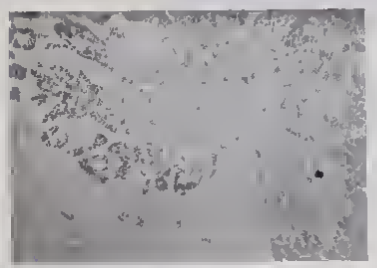


Fig. 1 Case 2 [illegible] cancer mouth (H & E) [illegible]



Fig. 2 Case 2 Cerebrum without tumour (H & E) x98



Fig. 3 Case 3 Right lobe [illegible] showing [illegible] tumour

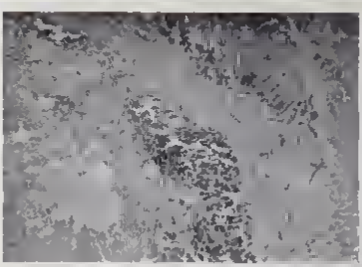


Fig. 4 Case 4. [illegible] Cell carcinoma (H & E) ×90

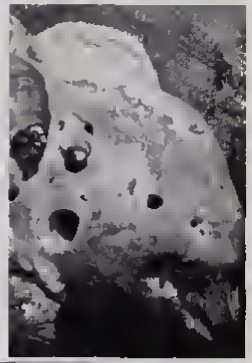


Fig. 5 Case 3. Left lateral aspect of face showing [illegible] crusting with infiltrating carcinoma [illegible]

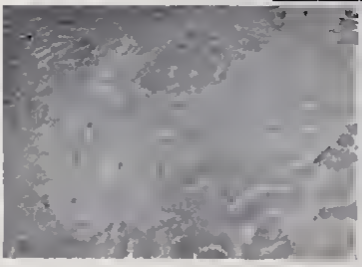


Fig. 6 [illegible] carcinoma [illegible] (H & E) [illegible]

had been replaced by tumour which was largely necrotic and this had fungated and bled (Fig 3) The left lobe was the site of fine fibrosis with only a little tumour Secondary tumour deposits were found in the lower lobes of both lungs The macroscopic and microscopic appearances of the tumour were similar to those in Case 2 but the remaining liver showed fibrosis of biliary distribution with preservation of lobular architecture Clonorchis infestation was not demonstrated in sections nor in the bile

Case No 4 W A H aged 75

In contrast with the previous two cases this patient was admitted in advanced hepato-renal failure with neurological complications severe enough to suggest carotid thrombosis He progressed into coma and died after a month At post mortem he also showed portal cirrhosis with a necrotic large tumour in the right lobe of the liver histologically liver cell carcinoma (Fig 4) There was severe renal tubular necrosis This is a pattern of the termination of cirrhosis in hepatic failure with tumour as an incidental complication In such circumstances tumours may easily be missed since they are often small

Case No 5 J V G aged 63

The presenting conditions were arthritis of the knees and thrombophlebitis of the legs but after admission attention was directed to an abdominal mass with a story of alternating constipation and diarrhœa Laparotomy showed tumour deposits in peritoneum and liver with an epigastric mass Biopsy of an omental deposit showed poorly differentiated adenocarcinoma The patient died three days later and at post mortem there were tumour masses at the aditus of the lesser sac surrounding the ileo-caecal junction and in the liver In the ileo caecal region the mass was well within the caecal wall and there was also suppurative appendicitis It was however the liver which held the attention In the left lobe were numerous cavities filled with gallstones of all sizes up to 1 in diameter (Fig 5) and between the cavities creamy yellow tumour Stones were also found in the gall bladder None of these stones was seen on X ray in life but calcification (confirmed at post mortem) was present in the ileo-caecal region There is an alleged association between the rare condition of hepatic cholelithiasis and primary carcinoma of the intra-hepatic biliary system and this seems reasonable The histology however revealed that the caecal mass was primary adenocarcinoma with secondary deposits in omentum and liver and the cholelithiasis was quite incidental as suggested by Willis (1960)

This patient's father had died at the same age from Tumour of the Liver

Case No 6 J H C aged 70

This patient was seen at the same time as the former He was severely ill with obstructive jaundice and ascites Clinically this was thought to be due to malignant disease with obstruction of the inferior vena cava and so it proved at necropsy a week after admission Tumour was found localised to the right lobe of the liver growing down the right hepatic duct and constricting the inferior vena cava in which there was ante mortem thrombus There was no tumour in any other organ and a diagnosis of cholangio carcinoma was suggested on the gross findings After the

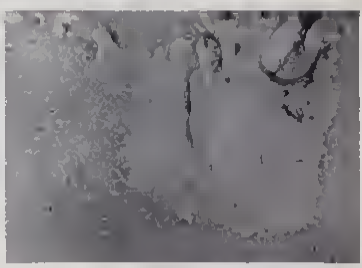


Fig. 6. Case 5. Section of wedge from right lobe of liver showing mucoid carcinoma (Alcian Blue) ×90

experienced. In Case 5 this was sceptically received but the liver biopsy was consistent with this diagnosis (Fig 6). The spread via the hepatic duct is supporting evidence (Dr Landell's report) and the absence of tumour elsewhere is powerful negative evidence. Carcinoma of the biliary tract is the rarer form of primary liver tumour and as in this case is not specifically associated with cirrhosis.

Case No 7. H.W.E. aged 80.

This old man was admitted with deepening jaundice of obstructive type. No abdominal mass was palpated and because of his good general condition the abdomen was opened with a view to a possible drainage operation. The gall bladder was found to be seized to a mass in the porta-hepatis and the adjacent liver contained tumour which was biopsied. The gall bladder was opened releasing black treacly fluid and drained though nothing further came away. He died several days later.

The biopsy showed a very mucoid adenocarcinoma (Fig 7). At necropsy tumour was localised to the porta hepatis, gall bladder and adjacent liver. The



Fig. 8. Case 7. Gall Bladder showing normal mucosa overlying infiltrating mucoid adenocarcinoma in wall (H & E) ×90

stomach and duodenum were normal. There was a small round secondary deposit close to the head of the pancreas. There was no tumour anywhere else. The gall bladder contained blood clot. Its mucosa was largely replaced by carcinoma which had involved the liver (Fig. 8). The histological diagnosis was primary carcinoma of the gall bladder, which is commonly mucoid.

Discussion. The experience of a variety of liver tumours and conditions in such a short period naturally stimulated great interest, and while biliary adenomata and hepatic lithiasis are pathological curiosities, in this small group the allegedly rare primary hepato-carcinomata presented real clinical problems, particularly in the strikingly similar Cases 2 and 3 with intraperitoneal haemorrhage.

Everybody has probably heard of primary tumours of the liver, that they are rare except in South Africa, and should not be diagnosed clinically in Europeans (particularly at post-graduate examinations). Since, in the present state of medicine, liver tumours are the subjects of therapeutic nihilism such an attitude does no real harm. It is not suggested that the present group of cases does anything to alter this picture, but the material presented gives food for thought on the subject of the rarity of various conditions of the liver and some of the future clinical and pathological problems.

Accurate post-mortem diagnosis is little more than an exercise, unless it can subsequently lead to better clinical recognition and therapeutic benefit. At the moment, diagnosis of tumours of the liver in life is only precisely made on biopsy material, and treatment is at best palliative. This may not always be so, since the biochemical study of the liver is constantly advancing. ("Human chemical physiology is an intensive study of the rat's liver"—Anon.) and in the therapeutic field cirrhosis, and indirectly tumours, are already under attack by cytotoxic agents as a suppressant of immune body formation. With an organ like the liver, so readily the repository of drugs, there are great possibilities in this field.

A first step in diagnostic advances must be the recognition that primary tumours of the liver are not so very rare.

This small group of sixteen tumourous livers showed four malignant and one benign primary tumour, eight cases of secondary carcinoma and three reticuloses. Obviously these figures are of no great significance compared with larger published series. These have recently been reviewed by Elkington, McBrien and Spencer (1963) who added a further series from 7,000 autopsies at St. Thomas's in the last twenty years. They showed an overall incidence of 0·52%, comparable with larger and smaller UK and US series, with a high incidence of carcinoma in cirrhosis, rising from 4% in the first five years to 25% in the last. The incidence of cirrhosis at post-mortem had also doubled in the same period, even applying the strictest histological criteria for cirrhosis, thus there was a fourfold increase in tumour incidence.

There is then an apparent rise in incidence at PM. This may be partly due to PM incidence coming closer to the true incidence since necropsies are (or should be) approaching 100% on hospital deaths; cirrhotics may be living longer and dying in hospital more regularly, and cirrhosis itself may be on the increase. Interest in a

subject usually leads to more frequent diagnosis and when post mortem examination is followed by careful histology more such tumours are bound to be discovered

Case No 5 raises a number of interesting questions Sanes and MacCallum (1942) described two patients in whom chronic cholangitis with multiple small stones in the liver was accompanied by carcinoma both originating in papillary growths in dilated biliary ducts The carcinomata were small and not responsible for clinical symptoms.

In the case described above the first impression of cholangiocarcinoma complicating liver stones was not substantiated The cavities in which the gall stones lay did not contain pus or gravel and there was no acute inflammation in the surrounding liver

The occurrence of extensive hepatic cholelithiasis is a rare event and it is not referred to in any of the standard texts on Pathology or Surgical Pathology available to me nor in Diseases of the Liver and Biliary System (Sherlock 1963) The best reference so far discovered is a paper by a Moscow surgeon (Rufanov 1936) in which he collects 52 cases from the literature and adds five of his own Most of the cases described were accompanied by acute cholangitis and cholecystitis and a quiescent type (his Group I) was the rarest He also reviewed post mortem series by Courvoisier (1903) in which only one case of liver stones was seen in 16 000 autopsies Walvuzew (1904) in which two cases were seen in 945 autopsies, Hesse (1911) in which one case was seen in 17 000 autopsies and Miyake (1913) with 8 406 autopsies in which twenty cases of liver stone were seen This Japanese series draws the comment that the disease is relatively frequent in Japan I understand that a similarly higher incidence is seen in Chinese patients Rufanov also states that cases of neoplasm in the bile ducts have been seen but gives no details

It is not surprising that a condition which is probably rarer than primary carcinoma of the biliary ducts cannot be incriminated as a stimulus to carcinomatous change Conversely it is too easy to associate primary gall bladder carcinoma (Case 7) with gall stones since these are common but the cancer is rare In Case 5 the association of hepatic stones with secondary deposits from a bowel carcinoma produced a striking pathological picture, and one I cannot find previously recorded Patients with cirrhosis who develop carcinoma elsewhere in the body are said only rarely to show metastases to the liver Lisa Solomon and Gurdan (1942) reviewed this question Twenty two of their cancer patients had cirrhosis and six of these showed hepatic metastases This figure is lower than for their whole series but doubtfully significant Sherlock (1963) quotes a later paper on this

About the pathogenesis of liver stones all that can be said is that there are usually accompanying gall bladder stones and in most cases obstruction and ascending infection The story of a family history in our patient stimulates speculation about hereditary factors—presumably the patient's father may also have had carcinoma of the colon

Clinical diagnosis of both primary hepatocarcinoma and liver stone presents similar difficulties Elkington *et al* (1963) showed abnormal rises in alkaline

phosphatase and alpha 2 globulin in about half their cases with no obstructive element but since similar changes can occur in uncomplicated cirrhosis the value of this observation is limited A point of clinical importance was the frequency of peptic ulceration in their cases of hepatocarcinoma leading to the caution not to attribute upper abdominal symptoms entirely to such ulceration when there is a possibility of cirrhosis and its consequent tumour

It was notable that in our case of liver stones these were not seen on X-ray despite their number and size

Summary Seven cases in which the liver contained tumour at necropsy are described Five showed primary liver tumour of which one was benign and the other two showed secondaries one from gall bladder and the other from the caecum but associated with the rare condition of hepatic cholelithiasis

Clinical and pathological points arising from these cases and the literature are briefly discussed

ACKNOWLEDGMENTS

I am grateful to Surgeon Rear Admiral E D Caldwell for permission to publish this paper HM Coroner for the City of Plymouth consented to publication of cases 1 and 7 Dr J W Landells (Consultant in Morbid Anatomy to the Royal Navy) kindly reported on the histology in cases 1 and 6 Surgeon Commander F J Preston carried out the autopsy on case 6 and has also shown a helpful interest in this paper I am also grateful for technical assistance willingly given by the whole Laboratory Staff and in particular Mr A Turner Senior Scientific Assistant who made the histological preparations from which the illustrations are taken

TECHNICAL NOTE

Photographs were taken on Kodachrome film using the Kodak Colorsnap Clinical Camera Photomicrographs were made on a Baker (Service Afloat) monocular microscope with 16 mm objective using the dark ground substage lamp with pale blue filter on Kodachrome II film in an obsolete Service Leica camera with microscope attachment

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TEN CASES OF DERMAL LEISHMANIASIS NEAR ADEN

By Surgeon Commander R. H. Broughton, RN

In August 1963 while on an exercise north of Aden a Royal Marine detachment comprising about 140 men slept out in the scrub and next day many found they had been bitten extensively by some flying insect—presumably a sand fly of the Genus Phlebotomus. During the next few weeks a number of indolent boils appeared on the exposed surfaces where they had been bitten and these tended to persist despite the usual treatments. In some cases on return to the UK after many months these lesions began to make their first appearance.

At the Royal Naval Hospital Plymouth biopsies were performed revealing Leishman-Donovan bodies contained in macrophages in the upper dermis which confirmed a diagnosis of dermal leishmaniasis or Oriental Sore. In one patient it was possible to demonstrate the protozoa in a direct smear. To date ten cases have been confirmed and it is possible further cases will present within the next year. Treatment was difficult and all patients were slow to respond. At first 'Pentostam' (Sodium antimony gluconate) was tried for 10 days by IM injection into the buttocks in 6 cc doses. There was no response and so it was next given IV for 3 days and also intralesionally 1–2 cc for the same period before discontinuing. Pentamidine isethionate 300 mgm daily IM for 3 days was then attempted

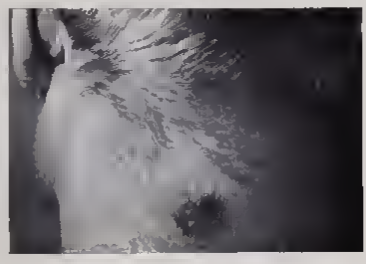






but abandoned after 1 severe reaction of collapse and cyanosis in one patient and painful local swellings in two others Mag sulph and glycerine dressings were found to be useless and so finally 60 seconds of CO_2 was used directly onto the areas which produced the desired blistering effect in 24 hours All cases so treated have been followed up for 2 3 months with entirely satisfactory results that is pale scarring and slight pigmentation only

Dermal leishmaniasis is characterised by cutaneous granulomas resembling indolent boils having a reddish blue tinge There is a strong tendency to ulceration Spontaneous resolution occurs in about a year though recurrence is probable without treatment In this type only the skin is affected and the disease has a widespread geographical distribution (Western India Asiatic Russia Iran Iraq Turkey Arabia and all countries bordering the Mediterranean Abyssinia the Sudan Congo and Nigeria Central and South America are also places where it occurs usually in the form of the so called mucocutaneous type) The disease is



caused by a protozoan known as Leishmania tropica and donovani It is a distinct clinical entity from Kala azar (Visceral leishmaniasis) which is a chronic infection of the reticulo-endothelial system with enlargement of the spleen liver leucopenia, anaemia and hyperglobulinaemia Leishmania brasiliensis resembles oriental sore but shows ulcerated lesion of the nose mouth and pharynx Sandflies act as vectors and transmit direct to humans and animal reservoirs exist in the dog and smaller rodents The basic change is infiltration of the upper dermis by macrophages containing the parasite which can be seen under oil immersion as tiny red dots in the cytoplasm of the macrophage The incubation period varies from a few weeks to several years The infection is usually followed by immunity

This form of leishmaniasis responds less satisfactorily to chemotherapy than does Kala azar It is probable that many cases labelled desert sore or tropical ulcer are in fact due to this disease and it is recommended that all troops sleeping out in the desert at night use insect repellent Mosquito nets will not, of course keep out the sand fly The best treatment with present experience is 60 seconds of CO_2 snow which should produce a cure

ACKNOWLEDGMENT

I wish to thank Surgeon Captain F H Lamb Senior Medical Officer 43 Commando Royal Marines for his kind co-operation in reporting these cases

THE ROYAL NAVY MEDICAL CLUB DINNER

The annual dinner of the Royal Navy Medical Club was held in the Painted Hall at the Royal Naval College Greenwich on Monday 27th April 1964.

The President, Surgeon Vice Admiral D. D. Steele Perkins CB CVO QHS delivered the following speech:

It is not without some trepidation that I appear before you tonight on this my first occasion as MDG. I feel like the chronic mess critic who, because of his constant complaining, suddenly finds he has been made mess secretary. Now that I have had a chance to see everything from the chair in perspective—it is a salutary, even humbling experience.

It is my pleasant duty tonight to welcome you all to this our annual dinner of the Royal Navy Medical Club. It is our 53rd anniversary and I want first to thank those who have made it possible for us to hold the dinner in this splendid setting. There is the President of the College, the Captain and all his officers who have given the greatest possible help in organising this evening. And equally important, the staff and the Royal Marine Band who have done us so proudly.

By custom it is the practice for MDG to divide his remarks into two parts: the first a review of the events and happenings of the year, followed by a welcome to our official guests. In this I will not depart from the custom of my distinguished predecessors. For I am a traditionalist, but one who believes that traditions can only survive if the branches which stem from the roots are alive and adaptable to the trends of the age. Thus the many progressive changes taking place today in our Service reflect the efforts of my predecessors. When a little of the sunshine they created breaks through the clouds, I can and do bask in it. In stormy weather I carry the can.

Of the events and happenings of the year, I must first mention the splendid films on exhaled air resuscitation and closed chest cardiac massage produced under the direction of Surgeon Captain Stanley Miles from the Royal Naval Medical School. These films achieved a tremendous success all over the world, and there are now over 600 copies in circulation and several being prepared in foreign languages. The films achieved the great distinction of winning the BMA Gold Award and are to be shown at the film festival at Cannes. Our most hearty congratulations go also to Surgeon Captain Forbes Guild on winning the Parkes Memorial Prize for the best paper on Hygiene submitted triennially from the Army and the Navy. The prize is a gold medal and a cheque. We hoped he might be with us tonight to help him to spend it, but unfortunately he is far away in Gibraltar. Our heartiest congratulations also to Surgeon Captain Eric Gerrard RNR on his promotion to that most onerous post of President of the British Medical Association for 1964. He always was a most successful Gynaecologist and Obstetrician and had a great way with the ladies. He has clearly adapted his technique in other directions equally successfully. And now to the subject of recruitment.

"Our Permanent List of Medical Officers which represents 60 per cent of our strength is only three or four short. We are about 50 down on the Short Service List but thanks to a change of heart by a number of Short Service Officers and entry of graduates our position is better today than was forecast. The Sub Lieutenant scheme is going very well we are getting a splendid type of young man and this year we hope to see some registered and joining the Fleet. The Dental Branch is fully complemented and there are more applicants than vacancies. I must also mention our several lady medical and dental officers who are all so attractive particularly in naval uniform which should help to keep all eyes in the boat. I would like to acknowledge how much the British Medical Association has done to help the Royal Navy particularly on recruiting and in the Sub Lieutenant Scheme. Without their help our Branch today would be dwindling to a few senior medical officers.

During the past year I have been able to visit a number of ships and establishments at home and abroad. I have just returned from an interesting and instructive trip to the Persian Gulf and the Far East. Nearer home—Gibraltar commissioned the month I took over, so naturally I had an overwhelming curiosity to see the new acquisition. I found the hospital as turned over by the RAMC in absolutely first class order. The hospital has been very busy in all spheres of medicine with plenty of family work. One of their first cases which I feel must be unique in the history of a naval hospital, was to repair a large hernia in the inguinal canal of one of the senior female apes on the 'Rock' named 'Mandy' for reasons I won't elaborate. Tradition has it that the continuation of the Union Jack on Gibraltar is dependent on the survival of the apes so we had a very real interest. The ape presented a major problem in anaesthesia with her extreme ferocity and unpleasant dental state. Having tried all the pre medication drugs without any effect whatever the anaesthetist resorted to an old-fashioned naval method of dealing with non co operative persons and rolled her up in a scrambling net and doped her with chloroform. Mandy happily was released after a normal post operative recovery and is now disporting herself on the 'Rock' propagating her species in the best Darwinian pattern—her sex appeal apparently undiminished.

You may be wondering about the future of the Medical Branch. Your guess might well be as good as mine. The medical task for the Navy will I believe continue at an increasing level for a number of years. The problems of modern ships and weapons increase the medical demands in peace time and in war time may swamp it. The percentage of naval married men is increasing and so it seems is the size of their families. As long as conventional forces exist the naval medical service is going to offer a challenging, interesting and full life for a doctor and his family.

The new position of our Service under the umbrella of the Ministry of Defence is bound to affect the future development of the Medical Branch. Its association with the other two Defence Medical Services will come under critical review. It is a situation that no planner could resist looking at again—although it will be for

the 3rd or 4th time since the war The predators are already on the prowl Even more interesting are the closer links we are developing with the National Health Service Our tasks are basically the same and the common interest could lead to a common hospital service in which the provision of beds will be determined by the needs of the major user in the district Service or civilian But let me emphasise that without a comprehensive hospital organisation in our structure the Naval Medical Service would soon disappear There is every indication of a growing liaison and goodwill between naval medical the civilian academic bodies and the National Health Service and of course a very close and warm relationship with the medical branches of our two sister Services

During the last year our medical and dental officers have been most successful in winning higher degrees and diplomas but a higher degree is only half the battle of specialisation Clinical teaching experience and confidence are just as important in achieving the standards we require and there can be only one standard for the Navy today—the best I have for some time felt that we are not making the most of our opportunities of post graduate study teaching and clinical research in the Navy Towards remedying this the former appointments of Professor of Surgery and Professor of Medicine at Haslar are being revived To give these appointments status the Presidents of the Royal College of Physicians and the Royal College of Surgeons have agreed to create jointly with the Navy a Chair of Surgery and a Chair of Medicine at Haslar so strengthening the long association of the Colleges with the Navy

There are many tasks ahead in the sphere of research which are particularly challenging—and others perhaps a little less exciting but equally important in the realms of Preventive Medicine and conventional medicine and surgery During this year perhaps the greatest single task has been the planning and provision of a Radiological Protection Service a product of the problems of the nuclear powered vessels We are continuing our research into problems of acoustic trauma deep diving warship habitability and underwater escape and survival to mention only a few

Next year this dinner will be on a Friday and the Admiral President has given me permission to hold a Symposium on Naval Medicine and Research here in the College—so that we can give you a practical demonstration of Naval Medical activities Those of you interested can combine the assimilation of knowledge with the customary splendid dinner to round the day off

In conclusion it is my privilege to welcome our guest of honour tonight. Sir David Luce the First Sea Lord I welcome him with the greatest pleasure the more so as this is the first occasion in the history of our club that a First Sea Lord has attended one of our dinners I feel that any description of Admiral Luce's career is quite unnecessary and I know that all our members here appreciate the fact that in spite of all his responsibilities and calls upon his time he has honoured us by being with us tonight

We are delighted to have Admiral De Haan with us tonight representing the Medical Branch of the Royal Netherlands Navy—he is indeed well known to many

of our Medical Officers throughout many years of service both in peace and war—and equally well known as the doyen of all the naval medical officers who attend the annual SHAPE meetings.

We had hoped also to welcome Vice Admiral le Breton the Medical Director General of the French Navy but he alas has been unable to come at the very last minute because of urgent family matters—he has asked me to say how much he had looked forward to tonight—the French Navy is however most eminently represented by Captain D Curet.

I welcome also our guests from the United States Navy. We are delighted to have them here with us tonight.

Our official guests also include many distinguished leaders of the Medical and Dental professions to many of whom our Service is personally indebted for active help and encouragement on different occasions. Unfortunately time does not permit me to make separate mention of them but I know they will accept the wish for the deed.

'And now Gentlemen Members of the Club I ask you to rise and drink to our guests.

Replying for 'The Guests' Sir David Luce KCB DSO OBE said:

Admiral Steele Perkins, Gentlemen. I am most privileged to be your guest of honour this evening, especially as I hear that I am the first First Sea Lord ever to have been present on this occasion.

My relationship with Service doctors and dentists has so far been confined mainly to the pre prandial part of the day. I have not previously been entertained at dinner by a body of medical officers let alone such a large and impressive body and I am most honoured to be here tonight. I began to wonder towards the end of this excellent meal if I shouldn't need post prandial medical treatment for the first time. I do realise however that if I am ever to be so afflicted now is the best occasion for it to happen.

I am pleased to see here this evening as well as RN officers, several RNR officers and retired officers. I am interested to see that you all keep in touch through the RN Medical Club and I hope that next year at the Symposium which I have heard proposed tonight you will combine benefit with pleasure. May I also say how welcome it is to see amongst the guests fellow naval officers from the Netherlands French and United States Navies.

You serving officers in the Royal Navy will I am sure be wondering whether an amalgamation of the medical and dental branches of the three Services will eventually come about. In Whitehall over this past month we in the Naval Staff have been busy moving into new offices in the Ministry of Defence and my title was changed on 1st April from First Sea Lord and Chief of Naval Staff to Chief of Naval Staff and First Sea Lord.

'This is a change of emphasis' and I think summarises the evolution that is gradually taking place in many of the various branches and departments of the three Services.

'Inevitably an even closer look will be taken at the possibilities of rationalising the medical support of the Navy the Army and the RAF and of reducing their overheads although as your Medical Director General has told us a great deal has already been done towards this

However you may be quite sure that we shall continually support the need for the Navy to keep its own Medical Service I believe we have enough problems special to life at sea to justify a separate body of naval specialists

'Apart from this and on some occasions just as important is the time honoured place of the Ship's Medical Officer as the guide philosopher and friend of all on board In my times at sea in command I have at least always made sure he was my friend as I was very conscious that he was the only ship's officer who could get me relieved of my command!

But seriously I don't myself consider that this important job of ship's doctor can be carried out so well by anybody who does not wear a naval uniform and feel himself by background and experience to be as much a naval officer as any other on board

I think I might mention another point on the subject of evolution where you medical men have little to fear In Elizabethan times the pay of a ship's doctor was less than that of a Chief Bosun's Mate By the present trend, MDG's pay will soon be more than mine

I was most interested to hear your review of events of the year Mr President This last year has been a successful one for the Naval Medical Branch including your treatment of Rock apes Though most of the achievements are in fields on which I am not qualified to comment I did read Surgeon Captain Forbes-Guild's paper on habitability of HM Ships and thought it quite excellent

One of the biggest problems facing the Navy now is that of providing acceptable conditions in nuclear submarines, particularly Polaris submarines with their very long patrols and I am glad to know that the Medical Branch is working on this subject You have of course a vested interest as there will be a resident doctor in each crew

'There was one subject on which you did not comment and that was sport I have always noticed and even grown to expect a strong representation by doctors in the various Navy teams I hope that this admirable tradition will continue to flourish

'Now I would just like to thank you Mr President most sincerely for the rare privilege you have shown me tonight in inviting me as your guest of honour Thank you all very much

Reviews

A Practical Manual of Physical Treatment for Nurses By Eli Kraul [illegible] MD MS Pp [illegible] Illustrated Springfield Illinois Charles C Thomas Publisher 1958

The [illegible] monograph consists of a number of reports never before published [illegible] The main [illegible] is ill founded for while there is much that is controversial [illegible] it is useful It can however justifiably claim to be practical and is aimed [illegible] the Nurse in attendance and hospital nurse

For [illegible] it seems a retrograde step to introduce yet another complicated classification [illegible] the general trend has been towards simplification and in a practical handbook [illegible] in dealing [illegible] one acute schema of early fluid replacement involving less exact solutions [illegible] scanted by unfamiliar abbreviations appears to limit its usefulness Not [illegible] always easy to discern the recommended policy In one section intravenous control is recommended from the beginning in another massive intravenous therapy is reserved for definitive grafting procedures But it is in the fields of biochemistry and pathology that the writer is least happy and it is a little disconcerting to find no guidance upon the quantity which may safely be given of such a potentially dangerous intravenous electrolyte as Potassium and that shock mechanisms are still regarded as contributing to renal shut down

Nevertheless the book contains many useful observations including the treatment of late infected alkalin [illegible] candidates with Zephiran and [illegible] and there is a refreshingly realistic approach to the nutritional problems of burns and some of the complications of their treatment Hypnosis has proved outstandingly successful in adults patients being persuaded that only to eat what is good for them but also to forget their discomfort and hypnosis might well prove the answer to an unsolved problem

The book [illegible] with some sound practical advice to nursing staff too often ignored by those who are accustomed to demand—and receive—devoted attention to their patients And it is evident that one sense of the writer's success is his awareness that it is upon the nursing staff that the outcome ultimately depends

Yet the British reader long accustomed to the benefits of the welfare state might find at first aspect of the American approach disturbing It is mentioned in one significant sentence in relation to some intensive burns We believe that the physician is obliged to energetically treat the burn which it is first seen though the cost to the family for even a few days treatment is enormous

J W

The Treatment of Mycotic and Parasitic Diseases of the Chest Edited by John D Stark MD Pp 259 Illustrated Springfield Illinois Charles C Thomas Publisher First [illegible] $14 75

This book is the fifth volume in the John Alexander Monograph Series in which the various aspects of thoracic surgery are studied in detail with Dr John D Steele Clinical Professor of Surgery at the University of California as editor there are eleven other contributors from the United States and one each from Peru and Venezuela

There are six chapters on North American Blastomycosis Histoplasmosis Coccidiodomycosis Actinomycosis and other pulmonary mycoses Hydatid Disease and Amoebiasis in chest disease and one on the laboratory aspects of pulmonary mycotic disease Each chapter is self-contained and profusely illustrated with radiographic reproductions which are of the superb quality for which the publishers have such a high reputation

The title of the book is misleading because the emphasis clearly is on diagnosis and histology of each condition as discussed as well as both the medical and surgical treatment thus making this a valuable reference volume All references modern and predominantly American bibliography concludes each chapter

With the ever increasing world wide travel of this age we must become more aware of the pulmonary mycotic and parasitic diseases and this book gives much information from those with great experience

J M C

Venereology (Recent Advances) By Ambrose King MD MB BS FRCS Pp viii + 496 4 diagrams London J & A Churchill Ltd Price 60s

This book might have been more appositely entitled A Venereologist's Digest except that the extensive method of presenting information culled from over 1 300 references in the literature tends to make it indigestible in the extreme A greater use of tabular presentation graphs and scattergrams would reduce the size of the book and in my opinion increase its value as a work of reference I do not imagine that the up to date Specialist in Venereology will discover that he must have this book on his shelves but the make learn and the thesis writer may well consider it essential reading The advances are very often only relatively

[illegible] ple in the chapter on Chimerid [illegible] k in this field the most recent [illegible] 1954 and in the [illegible] NGU only 11 out [illegible] these [illegible] Dr Kings [illegible] late 1961 and [illegible]

This will be found interesting by Service GP and I can recommend particularly the chapters on Rotator cuff [illegible] and Tuberculosis by Dr John Hamnick and Dr Philip Rudin respectively which are [illegible] readable as well as informative

The writer has not been afraid of naming names of running battles with Dr King's medical and school authority [illegible] and confesses to findings akin to mild concussion but then a baby with a gestation period of 15 years as this man had is likely to be more formidable than most

C. R. W.

INJURIES OF THE SPINE By M. Bankoff Haworth and J. Gordon Paine. Pp. xv + 343 Figures 221. London: Baillière, Tindall & Cox Ltd. Price 85s.

This volume, edited by eminent Surgeons from the New World, deals with all aspects of injuries of the spine and is a spectacular work of the highest order. The book is the outgrowth of more than thirty years of experience and teaching.

Chapter I covers the history of this class of injury from the Egyptian period to the last decade. It was the subject of the Presidential address of Dr George Bennett before the American Orthopedic Association in 1942.

The modern section of the book deals with both spinal fractures and neurological injuries the former by the distinguished orthopaedic surgeon Bankoff Haworth and the latter by Gordon Paine an orthopaedic associate of the late William Cone neurosurgeon at the Montreal Neurological Institute who had vast experience of spinal injuries involving the central nervous system.

Chapter 2 deals with the cervical spine. The subject is dealt with in the following order anatomy etiology pathology clinical features diagnosis preliminary differential diagnosis treatment specific injuries and bibliography. Chapter 3 covers the thoracic and lumbar spine and is dealt with in a similar manner as is Chapter 4 which covers neurological injury.

The book is splendidly illustrated with numerous X-rays and diagrams and perfectly attractively produced. There is little to quarrel with in the text although some of the techniques suggested would seem a little dated.

This is a classic on the subject and will undoubtedly find a place in the libraries of Naval Hospitals.

P. D. G. F.

Donald Paterson's Sick Children—Diagnosis and Treatment. Edited by R. Lightwood. MD FRCP DPH and E. S. W. Bramblecombe. MD FRCP. DCH. Eighth Edition. Pp. xi + 724. Plates 23. London: Messrs. Cassell & Co. Ltd. Price 50s.

Having used a much earlier edition of this famous book as a medical student it was with great interest that I read the latest edition. Dr Donald Paterson first dominated Paediatrics in London in the decade prior to 1938 when he retired to Canada. The original manual was much smaller and kept the needs of the senior student and General Practitioner constantly in mind.

The present edition has undergone radical revision due to the ever increasing advance in paediatrics. The emphasis on diagnosis and treatment has been retained. It is not a complete reference book but is intended as a working manual for the medical student the post graduate undergoing probationary training and the practising doctor in Child and Welfare.

The chapter on Diseases of Childhood in the Tropics is extremely well written and of great value to Service medical officers. There is an excellent new chapter on emotional disorders of childhood although the book strikes a balance between physical and emotional disorders throughout.

The recent advances and modern views have all been invited such as galactosaemia carbohydrate intolerance, neonatal hypoglycaemia, respiratory distress syndrome, phenylketonuria, Diabetic mum, accidents in childhood and midwifery disorders. Extensive revisions of subjects such as use of steroids in asthma and the disease, anorexia and rheumatic disease are dealt with satisfactorily.

For further reading references are given to minutes and there are most useful appendices.

The book is reasonably priced, clear to handle, most readable and can be described as a comprehensive textbook almost a reference book.

C. W. J. U.

CLINICAL NEUROLOGY By Lord Brain. DM. FRCP. Second Edition. Pp. x + 400. Illustrated. London: Oxford University Press. Price 30s.

The second edition of this book first published four years ago has enabled the book to be brought up to date. The author has attempted to present to practitioners and senior students the essentials of neurology without going into too much anatomical and physiological detail also omitting rarer diseases. Many detailed information can be found in the author's large Textbook of Neurology which is a standard work of reference and one of the medical classics of our time.

The text is divided into five parts Part I Disorders of sensation—Symptoms and signs Part II Disorders of anatomical regions Part III Infections Part IV Diffuse and systemic Disorders Part V Psychological Disorders

A General Practitioner will find it difficult for quick reference for many of the differential diagnoses if a particular symptom such as vertigo weakness of the lower limbs blackouts paresthesiæ or limbs The section on psychological disorders covers the organic dementias very briefly and gives more attention to the psychoneuroses.

There are references at the end of each chapter for further reading The illustrations which have been added to and revised are excellent The furniture is extremely good and the price very reasonable C W J U

MANAGEMENT OF ORAL EMERGENCIES. By Daniel M Laskin DDS MS Pp xv + 107 Illustrated Springfield Illinois Charles C Thomas Publisher Price $5 50

Professor Laskin has taken a very wide interpretation of the term Oral Emergencies in his book and in it he covers not only the true emergencies which need not be enumerated but also the multitude of incidents that can arise at times in the dental surgery

The size and layout of the book make it ideal for frequent reading which is the author's intention and anyone familiar with the contents should be well placed to deal rapidly with any emergency as it arises

Open chest cardiac massage is not included but the occasions must be rare when the dental surgeon is faced with this manœuvre without surgical aid On the whole an extensive field is covered and even injuries to the eye are included G D S

WHAT IS SPORTS-MEDICINE? By Ernst Jokl MD Pp viii + 86 Springfield Illinois Charles C Thomas Publisher Price $4 75

At a time when the significance of medicine in relation to organised sport is receiving much attention this useful book is most appropriate and timely published It is in some extent a review of current books and papers on the subject Although the subject is divided into three constituents of Applied Physiology Sports Surgery and Clinical Medicine this is a somewhat artificial division

In the introductory historical review one can see the gradual unfolding of the science of sports medicine which would seem to justify the final claim that sports medicine should be recognised as a major discipline of medicine This is followed by a critical review of literature which for those interested will be a most valuable and time saving section It is only when this has been studied that the extent of the field is appreciated

This is not the sort of book that can be picked up and read at all leisurely but for the Medical Officer or Physiologist who is in any way associated with organised sport it will be a most useful compendium S M

THE COMPLICATIONS OF MODERN MEDICAL PRACTICE A Treatise on Iatrogenic Diseases. By David M Spain MD Pp xvi + 347 91 illustrations New York and London Grune & Stratton Price $12 75

and who could have dreamt a generation ago that hypervitaminosis would become a common form of nutritional disease in the Western World" and the use of X-rays would be held responsible for the increase in certain types of cancer? that patients with all forms of iatrogenic diseases would occupy such a large number of beds in the modern hospitals? (Rene J Dubos in The Enlargement of Medical Science)

Iatrogenic disease has become the burden of medical progress and we are all responsible for more illness than we at present accept There is hardly a page of this book which could have been written 25 years ago but since then sulphonamides antibiotics steroids antimalignants antidepressives hypotensive agents cytotoxic drugs to name but a few have appeared in the cause of medical treatment only to produce new and even more serious disease It is salutary to read this book and then reassess our treatment in the light of its dangers

Dr Spain Clinical Professor of Pathology at State University of New York has done a great service by collecting this mass of information on iatrogenic disease His approach is both clinical and pathological and he has provided numerous illustrations including a number of excellent photomicrographs Every chapter concludes with an extensive and valuable bibliography but it would be still more helpful if there was a specific reference in the text to a particular paper when the next edition goes to print J M C

THE TIRED BUSINESSMAN By Sir Heneage Ogilvie KBE FRCS MD Pp vii + 83 Springfield Illinois Charles C Thomas Publisher Price $4 75

The very title of this book is bound to sell a number of copies but quite apart from this the subject is treated with ability and experience. Indeed the field covered is wider than that suggested by the title which is dealt with in a single chapter The reader is taken gently through a series of discussions on the more popular—so called—hazards to advancing years Throughout the style is refreshing and at times quite amusing with a smattering of charming

personal reminiscences. Stress is at the root of all the troubles and the effects of this may be mental or physical, each playing an important part in the pursuit of longevity. The surest way to find a honorary death is to try to keep up with the Joneses.

It is significant that this book, though written by a very distinguished British Surgeon, is published in America where it will undoubtedly become a best seller. S. M.

TEXTBOOK OF MEDICAL TREATMENT. Edited by Sir Derrick Dunlop, Sir Stanley Davidson and Stanley Alstead. Ninth Edition. Pp. 979. Edinburgh and London: E. & S. Livingstone. Price 65s.

This is a remarkable book. When it first appeared 25 years ago there were thirty authors and yet the editors managed to co-ordinate the various opinions into a volume which was recognised as being of such value that it was reprinted within twelve months. Now we have the ninth edition and ten of the original authors are amongst the thirty-two contributors.

Why is this such a successful book? One notes immediately that the General Management of the patient is stressed in a manner which would be impossible in any universal textbook of general medicine. Then the advice on treatment is diagnosis wherever this is possible. For example—phenobarbitone is a far more expensive, it should not be prescribed (page 65) and Nitrofurantoin is expensive, and thus together with its poor activity and potential toxicity means that it has virtually no therapeutic application (page 60). A most important feature is that the text is up to date, proven therapeutic advances of the last twelve months are included and the old discarded.

No book with so many contributors can escape the problem of confusing opinions in different sections. A high initial dose of chloramphenicol is not advised in the enteric fevers in order to avoid a Jarisch-Herxheimer reaction (page 18) whereas it is correctly stated in the treatment of syphilis (page 183) that this reaction is an aid to prognosis and therefore there is no reason for starting treatment with minim doses of a drug. However such an example is not easily found—and this is remarkable in a book of nearly a thousand pages.

This book is a great credit to the Scottish schools of medicine, authoritative yet up to date, eminently readable and maintaining a rare culmination on the whole of medical treatment than can be found anywhere between two covers. Let us hope that it will go forward to maintain its pinnacle, meanwhile this edition is worth its 65s and more to all who practice medicine.

J. M. C.

INTRA OCULAR LENSES AND IMPLANTS. By Palin Choyne, BSc, MB, MS, FRCS. DOMS. Pp. x + 212. 115 illustrations (66 coloured). London: H. K. Lewis Ltd. Price £4 10s.

The insertion of correcting lens into the interior of the living eye is brilliant in its conception. The first successful insertions of plastic lens behind the iris in the posterior chamber were made by Harold Ridley in 1949. These lenses tended to become displaced even after most expert surgery and the introduction of implants between the cornea and iris were initiated by Strampelli in 1953.

The author of this monograph which embodies his thesis for the degree of Master of Surgery has developed lenses of his own design and a technique for their insertion into the anterior chamber. The indications for this procedure, its simple and hazards are fully treated. During a period of only 7 years long term results cannot be quoted but the vast majority of patients seem to tolerate the lenses well. The main indications are for aphakia in the young especially where only one eye is involved and where contact lens cannot be fitted also in cases of albinism where great relief can be obtained by incorporating an artificial iris in the implant. Soft cataract also offers a promising field especially where only one eye is involved.

A most interesting and ingenious section of the monograph deals with the implantation of a concave lens which when used with convex spectacles constitutes a form of Galilean telescopic lens system enabling sufferers from senile and other degenerations of the macula to obtain an enlarged retinal image. This field of application is very exciting in its possibilities.

Not every surgeon would care to have a piece of plastic planed into his own eye. The problem at the moment is that long term tolerance has yet to be determined. Anything which will save the young from having to endure unilateral aphakia or weak aphakic spectacles is welcome but the young will have to trust these Perspex implants for many years. The aged have no problem of this kind but most will prefer to wear spectacles. Contact lenses which they can be supported against aphakia well and can be easily removed while an implant when it becomes a source of irritation needs extraction by a major surgical procedure.

Some will find the author's style somewhat self-assertive but it must be borne in mind that the monograph is a thesis. The production and illustrations are of a high standard of excellence. D. F. G.

INSIGHT. By Dr. J. Bronowski. Pp. 108. Illustrated. London: MacDonald & Co. (Publishers) Ltd. Price 21s.

The standard of this publication which presents a series of TV broadcasts, is a model to the ability and showmanship of the author. It is full of fascinating anecdotic curios well

documentation and clarity will be appreciated. It is essentially a book for the amateur scientist or for anyone interested in the naturalistic philosophical aspects.

There is a natural sequence of events from the first chapter, when a child discovers the world to the final parts on the effect of time, the language of animals and a glimpse into the future. Each section is self contained and may be read in any order.

At 21s. it is remarkably inexpensive, considering the high standard of publication. S M

MEDICAL SOCIOLOGY AND CULTURAL ANTHROPOLOGY OF SPORTS AND PHYSICAL EDUCATION. By Ernest Jokl, MD. Pp. viii + 166. Many illustrations. Springfield, Illinois: Charles C. Thomas, Publisher. Price $7.50.

This second book by Dr. Jokl of Kentucky is a natural companion of his "What is Sports-Medicine". It is indeed the more interesting of the two and gives a detailed analysis of the place of sport in the development of culture, followed by the growing part played by medicine in recent years. There are many very beautiful illustrations which emphasize the musical nature of many sporting activities and a close association between the rhythm of body movement and music. Sport is indeed presented as a creative function. Following music there is a pleasing reference to the treatment of sport by the poets with Shakespeare observed

If all the year were playing holidays
To sport would be as tedious as to work

In the later chapters where the emphasis is on the medical interest much attention is paid to sporting achievements, competitive sports for women, mortality in sport, and vital statistics. Finally there are useful appendices of basic data, abundant references and an adequate index. S M

THE TEMPOROMANDIBULAR JOINT. Edited by Bernard S. Sarnat, MD, DDS, MS, FACS. Second Edition. Pp. xii + 260. Illustrated. Springfield, Illinois: Charles C. Thomas, Publisher. Price $12.50.

The temporomandibular joint provides a unique study in anatomical compromise. It is complicated by the non-fitting demands of two articular bodies each affected by a separate complex of muscles. Since they cannot be maintained in continuous accordance with the skull simultaneously a type of movement has evolved that is largely independent of them both.

Effectively the functional compromise has resulted in the mandible being dependent on a balanced suspension of ligaments and muscle, and not, essentially on bony contact. Mechanically in many respects this bears more resemblance to the suspension of the hyoid bone than it does to the workings of other mobile joints such as the knee or elbow. Nobody who has seen a case of bilateral fracture of the condyles with gross displacement on both sides, and the patient experiencing little apparent limitation of movement or even function can be in any serious doubt.

This goes part of the way to explaining the unique standard to the study of this particular region. Briefly it arises out of the anomaly of mutually intricate anatomical interrelationships being associated with the simplest of manual remedies. It would appear that the occlusion of the mandible with teeth of the upper jaw is more significant than its articulation with the skull and that the muscle attachments are more important than either.

The second edition of The Temporomandibular Joint is a case in point. Its professed intention is to co-relate the latest authoritative information—both basic and clinical—pertaining to the temporomandibular joint and related structures. And this it handsomely fulfils. In a majestic first chapter (contributed by E. Lloyd du Bois) it traces the history of the hinged jaw from the Silurian Period in the present day in man. The functional anatomy, embryology, muscle anatomy, movements and radiographic considerations are exhaustively examined and beautifully presented. So too is the pathology and the chapter on disorders, diagnosis and treatment. But here the old anomaly occurs. Enduring such general affections as vitamin deficiencies, hypopituitarism, hyperthyroidism, arthritis and the like which have general manifestations throughout the body and only affect the temporomandibular joint incidentally very few of the common abnormalities leading to dysfunction primarily arises with in the capsule. This is less readily noticeable to the United States than in this country and the meticulous procedures described here for identifying abstract bony relationships may appear to be seeking for the effects of the abnormality rather than its cause. Nine times out of ten the disability originates in an eccentric balance of the musculature either developed through some abnormality in the bite. Erosion, an abnormal pattern of mastication or some other excess of voluntary movement. It can usually be relieved of the tone of the established muscle tensions is disturbed by altering the manner in which the teeth bite together. The way this is done is sometimes less important than that it should be done. There must be many cases of clicking joints that could be equally well relieved by grinding the cusps raising the cusps or altering the bite or closing it a trifle. Whatever way the muscle tensions will adjust themselves to the new situation.

All this is implicit in the chapter dealing with treatment, particularly dental treatment of temporomandibular disorders. But it is obscured to some extent by the exhaustive analyses

of late, with the development of [illegible] lung run the treatment [illegible] surgery irrespective of [illegible] altering the brain. Over [illegible] fully concerned by [illegible] have wished that the [illegible] emphasised.

Otherwise the book is a joy to read. The [illegible] anatomical principles [illegible] is typical [illegible] companion to student [illegible] of any psychiatrist.

Psychological Medicine. By Desmond Curran CBE MD FRCP DPM [illegible] Printing. DM MRCP DPM. [illegible] Edition. Pp xvi + [illegible] E. & S. Livingstone, Ltd. Price 30s. [illegible] 3d postage.

The title given to this book by the author—'Psychological Medicine in relation to Psychiatry' describes accurately the nature and scope of the volume.

Once again this edition, the fifth since the work was first published in [illegible] of moderate size, well printed and well bound, which keeps up its very high standards which those authors have always achieved.

The contents have been thoroughly revised and all recent developments, whether clinical, medicolegal or administrative, are described. Under the Mental Health Act, 1959 and the changes in psychiatric administrative practice are discussed, the changes in medicolegal attitudes consequent on the Homicide Act, the question of diminished responsibility are considered, along with the problem of responsibility and the M'Naghten Rules.

In considering the clinical aspects of psychiatry the author [illegible] and objective descriptions of the various clinical syndromes, which [illegible] read and practical manner. They avoid the rather woolly and [illegible] in psychiatry which is displayed on occasions by other writers in the field. Hysteria, the voluminous new material which are not infrequently used in the textbooks in objective descriptions of mental illness.

As regards treatment the authors have taken a broad approach [illegible] treatment in its widest sense. Modern drugs as well as the older and more [illegible] fashionable methods of treatments are considered. The New developments of Day Hospitals, Night Hospitals, Hostels and Rehabilitation Centres are discussed and much practical [illegible] is given on the handling of the patient both in a hospital [illegible] Psychotherapy and its uses and abuses are considered once again the authors approach the subject in an essentially practical manner, avoiding the often unfruitful and [illegible] to this subject shown by other workers in this field. In conclusion, this is a book [illegible] Psychiatry well written, concise and essentially practical. I have [illegible] recommend it to all who are interested in this subject and which will give them [illegible] objective account of psychiatry and the problems met within the everyday [illegible] treatment of patients.

W. [illegible]

We acknowledge with thanks receipt of the following publications:

Annales Medicum. Malaya Edition. Annual. Journal of Tropical Medicine and Hygiene. Indian and New Zealand Journal of Surgery. The British Medical Bulletin. The British Medical Journal. The British Journal of Surgery. Blackwell Scientific Publications. Bristol Medico-Chirurgical Journal. Canadian Journal of Medical Science. Guy's Hospital Gazette. Journal of Medical Education. Publications of the Army Yaws and Treponematosis Research Council. Journal of the Royal Army Medical Corps. Journal of the Royal Medical Society. Journal of the Royal Naval Medical Service. Journal of Medicine. The Lancet. Medical Journal of Malaya. Medicine. Medical Press. Medical Digest. Medical Times. Middlesex Hospital Journal. Nursing Times. Journal of Medicine. Publications of the Medical Research Council. The Practitioner. Revista das Cruz Vermelha. Annual. Royal Naval Medical Service Journal. Science Progress. The Royal Medical Corps Journal. The Royal Medical Society. Journal of Experimental Medicine. Tropical Diseases Bulletin. The Dental Board of the United Kingdom. Medical and Dental Yearbook. The Indian Journal of Experimental Biology. Annals of Science. University of Manchester Medical Gazette. WHO Chronicle. Yearbook of Medical Sciences.

News of the Services

OBITUARIES

Surgeon Captain B R BICKFORD DSO MRCS LRCP DOMS Royal Navy died on 8th April 1964 at the age of 83 years

He qualified MRCS LRCP in 1903 and entered the Royal Naval Medical Service on 23rd November 1903 He was promoted to Surgeon Lieutenant Commander on 23rd November 1911 and Surgeon Commander on 1st March 1917

On the 13th of September 1916 Captain Bickford was awarded the DSO for services in the Battle of Jutland for great gallantry and devotion to duty in action Though severely wounded by shell splinters he persisted in attending to wounded only yielding when he was ordered to do so

On 16th March 1930 he was placed on the Retired List (Age) with the rank of Surgeon Captain

Surgeon Captain (D) J F PLACE OBE LDS RCS Royal Navy died on 1st June 1964 at the age of 77 years

He qualified LDS RCS in 1910 and entered the Royal Naval Medical Service on 24th June 1911 as a Civilian Dental Surgeon He was granted a Temporary Commission as Dental Surgeon RNVR on 2nd March 1915 and transferred to Permanent List of Dental Surgeons on 9th March 1920 He was promoted to Surgeon Lieutenant Commander (D) on 5th August 1920 Surgeon Commander (D) on 12th August 1929 and Surgeon Captain (D) on 12th August 1935 He was placed on the Retired List in October 1941

Surgeon Lieutenant W F JONES MB BCh, RN (Emergency) died on the 6th April 1964 at the age of 32 years

He qualified as MB BCh and entered the Royal Naval Medical Service in October 1956 as an Acting Surgeon Lieutenant (three years Volunteer Short Service) He was promoted Surgeon Lieutenant on 18th January 1957 and released in completion of his Short Service Commission on 17th October 1959 and placed on the Emergency List for 4 years

HONOURS AND AWARDS

Knight Commander of the Royal Victorian Order

Surgeon Vice Admiral Derek Duncombe Steele-Perkins, CB CVO QHS FRCS(Eng) FRACS DLO

Officer of the Order of the British Empire

Surgeon Commander (D) E R C Cliff FDRRCS(Eng) LDS

Member of the Order of the British Empire

Surgeon Lieutenant Commander F R Wilkins MB ChB MRCS LRCP

Commander of the Military and Hospitaller Order of Saint Lazarus of Jerusalem and Officer of the Most Venerable Order of St John of Jerusalem

Surgeon Lieutenant Commander J K Lawrance Dwch I MSSA DA

PROMOTIONS

To Surgeon Rear Admiral (D)
W L Monnium OBE QHDS LDS

To Surgeon Lieutenant Commander
W Whitrow MB BS MRCS LRCP J P Lissenden MB BS MRCS LRCP DObstRCOG

To Surgeon Lieutenant Commander (D)
L G Sullivan BDS LDS C M Berwick LDS

To Acting Surgeon Lieutenant
J N Davies MB BS LRCP P K D Bush MRCS LRCP I G Measey MRCS LRCP

Provisional selections have been made for promotion to date 31st December 1964

To Surgeon Captain
P B Nicol MB ChB DPH DIH W M Davidson OBE MB BCh DA J Glass OBE LRCP & S DPH

To Surgeon Commander
J D Walters MB BS DIH DPH D E Mankay MB ChB J Cox MB BS FFARCS D J C Walker MB BS MRCS LRCP J M Davies MA BM BCh DPH DIH R V Williams MB ChB MRCP

To Surgeon Captain (D)
W E Starkey OBE LDS

To Surgeon Commander (D)
J D Sievers LDS

PRE-REGISTRATION ENTRIES

Surgeon Sub Lieutenant G. E. J. Dennison and Surgeon Sub Lieutenant B. J. W. Pingree

NEW ENTRIES

Surgeon Lieutenant Commander Margaret V. Brown MB ChB DPH
Surgeon Lieutenants J. E. D. MacLaren BA MB BCh R. M. Milne MB ChB and Miss J. R. Phillips White MA BM BCh(Oxon)
Acting Surgeon Lieutenant J. C. Sharp MB ChB

RE-ENTRIES

Surgeon Lieutenant Commander D. J. Willshire MB BS LRCP MRCS DObstRCOG

TRANSFERRED TO THE PERMANENT LIST

Surgeon Lieutenant Commander M. J. Mann MB BS MRCS LRCP DA
Surgeon Lieutenant D. S. Wright MB BS

RETIREMENTS

Surgeon Captain J. Lees OBE
Surgeon Commander C. M. Lamont VRD
Surgeon Commander D. J. O'Donoghue

RELEASED ON COMPLETION OF SHORT SERVICE COMMISSION

Surgeon Lieutenant Commanders J. R. Seel D. M. Scruby P. B. Odgers and B. W. Fowles
Surgeon Lieutenant Commanders (D) M. S. Parrish and J. A. Bull
Surgeon Lieutenants D. P. V. L. Giles A. E. Wightman and R. F. McGann
Surgeon Lieutenants (D) J. R. White B. W. Toms and F. T. Dodge

WARDMASTERS

PROMOTIONS

To Wardmaster Lieutenant Commander J. C. MacKenzie
Wardmaster Lieutenant D. J. L. Vaughan
Acting Wardmaster Sub Lieutenant M. G. Harper

RETIREMENTS

Wardmaster Lieutenant Commander W. O. A. Anstis
Wardmaster Lieutenant A. S. J. Saunders

QUEEN ALEXANDRA'S ROYAL NAVAL NURSING SERVICE

HONOURS AND AWARDS

Commander of the Order of the British Empire

Miss J. M. Woodgate RRC QHNS Matron-in-Chief

Royal Red Cross (1st Class)

Miss A. A. E. Borman Principal Matron
Miss R. Quill Matron Tri[illegible]

PROMOTIONS

To Principal Matron Misses M. Fotherstone-Dilke ARRC and C. Thompson ARRC
To Matron Misses M. Kavanagh ARRC and M. J. Milne ARRC
To Superintendent Sister Misses B. K. Howe and B. Harries.

RETIREMENTS

Principal Matron N. H. Glew RRC
Superintendent Sisters Misses M. A. Perry ARRC and L. B. Nicholson

ROYAL NAVAL RESERVE

RETIREMENT

Surgeon Captain A. Roffman VRD MD BS

NAVY KISS OF LIFE FILM WINS INTERNATIONAL AWARD

The Royal Navy's film EMERGENCY RESUSCITATION which illustrates life saving by the Kiss of Life has won the Grand Prix the top award at the International Film Competition for medical films at the XVIIIth General Assembly of the World Medical Association in Helsinki. There were 119 entries from many different countries.

The film's Technical Adviser Surgeon Captain Stanley Miles of the Royal Naval Medical School Alverstoke flew to Helsinki to receive the award a certificate and a piece of blue Finnish glass. During his stay in the Finnish capital he was interviewed on radio and television regarding the film.

The Expired Resuscitation which is used widely by both Service and civilian medical personnel and workers in this country also received a Gold Award at the 1964 British Medical Association Film Competition. All four parts of the film will soon be distributed throughout North and South America.

ADMIRALTY FLEET ORDERS

464/64 Defence — The Unified Ministry of Defence

476/64 Pay and Allowances — Pay and Pensions Code 1964 — Officers RN and RM. Ratings RN Other Ranks RM WRNS Ratings and QARNNS Naval Nursing Auxiliaries

524/64 Pay and Allowances — Allowances — Overseas Family Allowance.

586/64 The use of ADMIRALTY in the titles of establishments, Offices and Appointments etc

633/64 Form F Med 176 — Recipient Blood Transfusion Card — Introduction.

DEFENCE COUNCIL INSTRUCTIONS

42/64 Accommodation — Married Quarters — Administration of Hired Furnished Married Quarters in the United Kingdom and Overseas — Instruction

43/64 Pay and Allowances — Naval and Civil Personnel — Subsistence allowance abroad.

44/64 Pay and Allowances — Pay and Pensions Code 1964 — Officers RN and RM Ratings RN Other Ranks RM, WRNS Ratings and QARRNS Naval Nursing Auxiliaries

45/64 Pay and Allowances — Ration Allowance — Special Ration Allowance and Special Victualling Allowance — United Kingdom

55/64 Training — Life Saving in the Royal Navy

56/64 Breathing Apparatus — Liquid Oxygen (LOX) Supply and Inspection at home and abroad

99/64 Funds — Naval Medical Compassionate Fund

194/64 Medals Decorations Honours — The Gilbert Blane Medal

195/64 Prizes — North Persian Medal 1964, for papers on Tropical Medicine or Tropical Hygiene

196/64 Prizes — The Erroll Eldridge Fund and Prize.

197/64 Prizes — The Parkes Memorial Prize 1964

225/64 Defence Ministry Reorganisation — New Titles

Journal

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1964

Editorial Staff
Surgeon Captain Stanley Miles RN
Surgeon Commander (D) W. E. Starkey OBE RN
Mrs J. K. Reynolds
Royal Naval Medical School Alverstoke Hants

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EDITED BY
SURGEON CAPTAIN S. MILES RN
SURGEON COMMANDER (D) W E STARKEY OBE RN
MRS J K REYNOLDS

ROYAL NAVAL MEDICAL SCHOOL ALVERSTOKE HAMPSHIRE

Editorial

A challenging event for the Royal Naval Medical Service will be the Symposium of Naval Medicine which is being planned for the 1st and 2nd April 1965. The following notice has been widely distributed to Medical Officers in Charge of establishments and Senior Medical Officers afloat.

A Symposium on Naval Medicine will be held at the Royal Society of Medicine 1 Wimpole Street London on Thursday and Friday 1st and 2nd April 1965.

The programme will consist of a series of papers by Naval Medical Officers and other invited speakers in the Barnes Hall. These will be of 20 minutes duration followed by a period of 10 minutes for general discussion. The West Hall will be available for exhibition stands representing various topics of Service medical interest.

A further small room will be available in which it is hoped to hold a series of panel discussions on medical subjects of a more domestic interest and show some films. These should give opportunities for Medical Officers of the Royal Navy and invited Consultants to study the special problems and attendance would be restricted.

The sessions on the two days will be from 1000 to 1700 with intervals for lunch tea and coffee. It is proposed also to hold a cocktail party possibly in the new Chaudos House on the Thursday evening. Friday evening is the day of the Royal Navy Medical Club Dinner at Greenwich.

A detailed programme will be promulgated as soon as possible, meanwhile it would be very much appreciated if any offers for papers, exhibitions and suggestions for topics for discussion could be forwarded as soon as possible to the Medical Officer in Charge, Royal Naval Medical School, Alverstoke, Hants.

The major part of the Symposium will be the series of papers in the Barnes Hall. Four sessions are being planned for each half day these are — Medicine and Surgery on the Thursday and Research and Hygiene on the Friday. Distinguished consultants are being invited to Chair these sessions and so far Sir Cecil Wakeley and Professor Donald have accepted for the sessions on surgery and research. Sir Terence Cawthorne, President of the Royal Society of Medicine, will welcome us on the first day to be followed by a few words by the Medical Director General. The morning session of the second day is being introduced by a talk on 'Some thoughts on the Nuclear Navy of the Future' by Vice Admiral H. S. Mackenzie CB, DSO*, DSC.

The proceedings of the Symposium will be published in the JOURNAL as soon as possible after the meeting.

JOURNAL of The Royal Naval Medical Service - new cover.

It will be remembered that in a previous editorial suggestions for an improved cover design were invited from subscribers. An encouraging response to this request resulted and there was an almost unanimous suggestion that the new cover should incorporate the Naval Crown over a serpent and staff to replace the present fouled anchor. The printers have been asked to produce a design which will be adopted as soon as possible.

Clinical Case

A CASE OF 'STOVE IN' CHEST TREATED AT SEA

By Surgeon Lieutenant Commander F. R. Wilkes, RN and
Surgeon Lieutenant A. E. Wightman, RN

The treatment of 'stove in' chest has become an increasingly common problem as a result of high velocity accidents on the highway. In these cases however there are usually a multiplicity of concomitant injuries. The case to be described was wholly due to a simple transverse fracture of the sternum resulting from a slow crushing force rather than the sudden heavy blow received by an automobile driver as the steering column is pushed into his thoracic cage.

Circumstances of Injury

A twenty year old naval air mechanic was occupied in servicing a Sea Vixen airframe on the flight deck of HMS *Victorious* when the pilot's canopy closed without warning and in doing so crushed the chest of the man who apparently had been standing on the ejection seat at the time. Immediate release of the rating was not effected for several reasons, the main ones being the aircraft was sited on the port bow and the drop tank on its folded wing hid the man from the flying control position, a launch was taking place on the starboard catapult and finally it was raining thus keeping most people off the deck. A conservative estimate of the time that the man spent trapped was between ten and twelve minutes. Fortunately the one horse power electric motor which closes the canopy slowly burned itself out as increasing resistance was encountered. When found the man was unconscious trapped by the relatively wide edge of the canopy in his back thrusting his chest against the narrow metal flange of the inner edge of the front screen. He was extricated with some difficulty and Sick Bay informed the time being approximately 1220.

Initial Clinical Findings and Emergency Treatment

The rating was first seen by one of us (FRW) on the foreward aircraft lift as he was brought down to the Sick Bay level. A rapid assessment of the man's condition was made and the findings were as follows: the man was deeply unconscious, the face and upper trunk were cyanosed but the most arresting feature was indrawing of the anterior chest wall with each inspiratory effort; such was the violence and rapidity that it bordered on respiratory convulsions; the pulse was already running at 160 per minute and the overall impression was one of an impending catastrophe. The patient was moved as quickly as possible along the somewhat tortuous passage to the Sick Bay theatre at which point his level of consciousness lightened and he became violent. At 1235 the patient was induced with an intravenous barbiturate, intubated and paralysed with a muscle relaxant the maintenance of respiration being taken over by the anaesthetist (AEW). A fuller examination of the man was now possible revealing the following features. There was a dusky hue

of the face neck and trunk above the line of the constriction which was marked by a transverse linear wheal over the sternum at the level of its junction with the fourth costal cartilage Present also were petechial haemorrhages of the conjunctivae soft palate and larynx further signs of the recent compression asphyxia The sternum had fractured transversely at the level of the wheal but no evidance of rib fracture could be found clinically nor was there any indication of the presence of pneumothorax haemothorax or haemopericardium The lower limbs were cold and pale however the femoral pulses were present and of moderate volume the blood pressure at that time being 90/60 and pulse regular at 130 per minute No evidence of intra-abdominal or limb injury was found the vertebral column also appeared intact although the presence of a neurological lesion could not be excluded at this stage The patient's condition improved as intermittent positive pressure respiration (IPPR) continued the pulse dropped to 100 per minute the mucous membranes became pink but the blood pressure remained at 90/60 A chest film was taken with a Fortex apparatus after a minor electrical crisis this confirmed the absence of gross intrathoracic pathology In view of the persisting low blood pressure an intravenous infusion of plasma was commenced at the rate of thirty drops a minute prior to this blood was taken for cross matching.

While these various procedures were being carried out the duty shipwright constructed a rectangular wooden frame 14in by 16in and 4in deep which was then padded with gamgee ready to be used as the external splint for the man's chest The theatre was next scrubbed out as the urgency of the initial situation had precluded changing out of wet flight deck boots and shoes before entering it with the patient as a result of which the deck was a veritable quagmire[1] It was not until 1500 that definitive surgery could be undertaken thus for nearly two and one half hours the anaesthetist had to maintain IPPR without respite

Anaesthetic Technique

With the patient in the head down position on the operating table anaesthesia was induced with Thiopentone sodium 500 mgms, and after 100 mgms of Suxamethonium had been given intravenously a No 10 cuffed endotracheal tube (Magill's) was passed under direct vision

The patient was connected to the closed circuit of a standard Boyle's anaesthetic machine Anaesthesia was maintained on nitrous oxide und oxygen Tubocurarine being given in divided doses to a total of 75 mgms over the course of the next four and one half hours Following tracheostomy a No 9 James cuffed tracheostomy tube was inserted and the cuff immediately inflated with 10 mls of air The anaesthetic was commenced at 1235 and IPPR was maintained until approximately 1700 by which time the patient was breathing spontaneously and maintaining his colour pulse and blood pressure No analgesic drugs were employed during anaesthesia

Operative Procedure

Under the continuing general anaesthesia the anterior chest wall was stabilised by six heavy nylon sutures placed three each side of the sternum under-running the third fourth and fifth ribs at their costo chondral junctions The nylon was



passed blindly around each rib with a [illegible] taken to keep the needle point against the chest wall to the rib above that the needle was only passed after the [illegible] sutures were each tied one inch from the chest wall to prevent the [illegible] slipping back into the pleural cavity and finally the six ends [illegible] to the upper beam of the wooden frame which had been placed [illegible] patient's back resting on its base The tension in the nylon was adjusted [illegible] they were taut when the chest was moderately inflated (Fig 1)

A tracheostomy was performed through a vertical incision over the third and fourth tracheal rings this necessitated division of the thyroid isthmus which fortuitously was not bulky The endotracheal tube was carefully removed and a No 9 James tube inserted

Evacuation

The patient's condition had continued to improve throughout surgery the blood pressure rising to 100/60 and the pulse slowing to 90 It was therefore decided to evacuate the man that evening as the ship was within helicopter range of Singapore Thanks to the efforts of 814 Naval Air Squadron and their Wessex helicopters who provided a cab for the patient and his attendants including a frogman whose sole duty was to ensure the escape of the injured man from the helicopter in the event of its ditching A second helicopter similarly equipped provided an escort during the forty five minute flight to the British Military Hospital Singapore The patient was maintained during the trip on a Boyle's Field Service anaesthetic machine breathing spontaneously The helicopter and its escort landed on the soccer pitch behind the hospital and were met by the Duty Surgical Officer as it happened a Surgeon Lieutenant Commander on loan to the Army Throughout the journey the patient's condition had steadily improved the blood pressure had risen to 120/80 and the pulse was steady at 90 The anaesthetic was discontinued at approximately 1810 some five hours and thirty minutes after its commencement and the patient was seen to be breathing rhythmically without distress his chest wall adequately supported by the frame



Progress

On admission to hospital the chest strips were transferred to a Balkan beam with balanced traction (Fig 2) Chest X ray showed a small right sided pneumothorax but with no mediastinal shift The haemoglobin was 90 per cent He was sedated with Paraldehyde and antibiotics were exhibited The subsequent course was uneventful no serious chest complications ensuing, this being due to the high standard of tracheostomy care of the nursing staff

When seen by one of us (FRW) eight days after the accident the patient was cheerful taking full diet and able to speak in spite of the tracheostomy There was no evidence of instability of the chest wall the pneumothorax had reabsorbed and more important there appeared to be no neurological sequelae The chest stays were removed after ten days and he was slowly mobilised The tracheostomy tube was removed after fourteen days and the wound healed without complications A fortnight s convalescence was arranged in the Cameron Highlands before the man was invalided to the United Kingdom He was finally discharged to duty at RNAS Lossiemouth some twelve weeks after his accident

Discussion

Stove in or flail chest occurs when a segment of the rib cage or occasionally the sternum sustains multiple fractures so that it floats and is thus drawn in with inspiration producing varying degrees of respiratory embarrassment depending on the area of the chest wall involved The indications for active interference are the presence of paradoxical respiration persistence of cyanosis difficulty with expectoration of bronchial secretions and depression of consciousness

Barrett (1960) laid down a regime for the treatment of these injuries There are three approaches to the problem — (1) Closed external fixation which in its simplest form involves turning the patient onto the affected side but is only applicable when paradoxical respiration affects one side (Roberts and Tubbs 1941) Other methods involve the use of towel clips or heavy non absorbable sutures passed round the ribs of the affected segment of the chest wall The loose segment is then suspended via these agents to an overhead frame There are a variety of

other methods along the same lines all involving an anchoring device in the chest wall attached to a form of counter traction

(2) Open external fixation This requires the exposure of the fractured rib ends and fixation with pins or wires (Bickford and Grant 1960) This is really only an acceptable procedure if an exploratory thoracotomy has to be performed or if a small area of chest wall is involved

(3) Intermittent Positive Pressure Respiration (IPPR) This after a preliminary tracheostomy is often the method of choice but only in well equipped centres which have the trained staff medical laboratory and nursing demanded by its complexities

The performance of a tracheostomy in itself decreases the dead space and likewise the tidal volume and the respiratory effort thus in cases with small floating fragments this decrease in dead space may be enough to prevent the gross effects of paradoxical respiration and maintain satisfactory oxygenation (Watts 1964)

The use of IPPR initially in this patient was supplemented by closed external fixation as it was felt that a 'stand by' was needed in case of any anaesthetic problems during evacuation by helicopter The pathology of the injury in this man i e a fracture of the lower third of the sternum with no associated rib injury amply demonstrates the resilience of the chest wall in a young adult Intrathoracic complications are a result of injury caused by puncturing of the viscera by shattered ribs and/or gross compression — the former did not occur and as already stated in the text it is considered fortuitous that the motor burnt out and compression ceased before the atria and the great vessels leading from the heart were subjected to continuing pressure with its concomitant cerebral complications The small pneumothorax may well have been a direct result of the prolonged IPPR or a minute tear of the lung tissue sustained during insertion of the stay sutures Fractures of the sternum both the complications and the treatment are only briefly discussed if at all in most current standard textbooks It is difficult to assess but the impression gained is that an uncomplicated fracture of this nature is a rare occurrence

Summary

The case described involved a young man who sustained a stove in chest at sea and was treated with IPPR and closed external fixation of the chest wall prior to his evacuation to shore by helicopter

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Articles

EMERGENCY LIFE-SAVING FIRST AID
A NEW APPROACH TO TRAINING

By Surgeon Captain J G Holmes, RN (Retd)

I have been closely concerned with First Aid training — lecturing examining, conducting exercises judging competitions for many years over 30 years in the Royal Navy 8 years in Home Office (Civil Defence) and from March 1962 to May 1964 as Civilian Medical Officer at the RN Atomic Defence and Damage Control School One of my duties in this last appointment was to accompany Captain (ABCD) on the Passive Defence (Disaster Control) inspections of the Fleet Shore Establishments in the Portsmouth Command and to report on the arrangements for dealing with casualties in any emergency of peace and war Obviously the standard and extent of First Aid Training had to be investigated and in most instances it did not take long at any inspection exercise for me and indeed for the other members of the inspection team to realise that the Casualty Organisation was well below what might reasonably have been expected Seeking to find an explanation we had various reasons and excuses advanced — among the more recurring were

1 (a) in these establishments the training programmes are very tight and intense Little or no time can be devoted to extraneous subjects such as First Aid the assumption being made that personnel should already have had it or would receive it somewhere else

(b) the regulations require 10 per cent of personnel to receive a full first aid course of 10 hours This is often spread over too long a period of time resulting in loss of interest and in many not completing the course

(c) the 10 per cent nominated for the full course are frequently of the detailed volunteer variety who start off with little or no interest in the subject

(d) the instructional techniques of medical officers and sick berth ratings is often dull and uninspiring far too much professional jargon and detail is introduced

Having ascertained at least some of the reasons or excuses we set about trying to discover a possible answer to the problem and a new approach to First Aid Training a new look began to take shape along these lines

2 (a) The basic requirement of a First Aider is to be able **to save life in an emergency** Many accidents become fatal because no one on the spot knows what to do and it is too late when skilled help becomes available e g the arrival of the Ambulance Service or the casualty's admission to hospital

(b) This knowledge of how to save life should be acquired by everyone and not by some arbitrary percentage of personnel

(c) Interest in acquiring this knowledge can usually be aroused and stimulated by reminding people that at any time they may be faced with emergencies in their homes or on the roads apart from what may befall in their service life in peace or war

3 So now we come to consider
(a) what is the minimum or basic knowledge which everyone should have and
(b) how long would it take to acquire it

4 There are only four types of emergency which may lead to early death unless prompt action can be taken by someone on the spot

(a) If breathing has ceased no oxygen is entering the body and death may occur within a few minutes Hence everyone should know how to carry out artificial respiration and it is now an accepted fact that the simplest and most efficient method is by exhaled air or 'kiss of life' a method which can be carried out under practically every conceivable emergency

(b) If the heart has stopped beating no oxygen is being pumped round to the various tissues of the body So again a simple method of trying to restart it must be learned this is the closed chest or external cardiac massage.

(c) If a large blood vessel is cut the oxygen-containing blood is being lost and is not reaching the tissues it should be supplying rapid loss of large quantities of blood will soon cause death

(d) All serious injuries are accompanied by surgical (injury or traumatic) 'shock' a response of the brain centres to the messages they received from the injured area Shock' is a very complex response to injury it is a mixture of pain fright and anxiety the latter two being the basis of emotional shock and it is always most severe where there is loss of blood or blood plasma (as in burns or scalds)

5 Therefore basic first aid consists of knowing
(a) how to perform exhaled air resuscitation
(b) how to perform external cardiac massage
(c) how to control bleeding
(d) how to combat injury shock
and we believe that these basic skills can be taught in about two hours

6 EAR and ECM can be learned from seeing parts 1 2 and 3 of the Royal Naval Resuscitation film followed by a practical period

7 The simplest safest and most efficient method of stopping bleeding in the limbs is by direct pressure over the bleeding area using the underlying bone or bones for counter pressure At this level of First Aid training the use of a tourniquet is to be deprecated inefficiently applied it can actually increase bleeding If internal bleeding is occurring then only efficient treatment of shock is available to the First Aider

8 The general principles of dealing with a seriously injured casualty are
(a) Keep lying down

(b) Put a coat rug or blanket underneath
(c) Keep warm but do not overheat (a 'shocked casualty is often cold and shivering)
(d) Give fluids by mouth — water or tea — unless internal injury is suspected — then only let the casualty rinse out his dry mouth
(e) Do not give alcohol because it dilates blood vessels and may increase or restart bleeding
(f) Handle and move very gently and carefully to avoid the pain of a serious injury
(g) Reassure and comfort a casualty and so help to relieve his fright and anxiety

9 The two hour course of instruction should follow this sequence
(a) A short introduction setting out the basic principles — say 5 minutes
(b) Showing of parts 1 2 and 3 of the 'Resuscitation' film — 40 minutes
(c) Practice in EAR, ECM Control of Bleeding Treatment of Shock — 75 minutes

But having evolved this new look to our own complete satisfaction we then had to sell the idea outside the School So for about 18 months Sick Berth PO Charlton and myself told all the classes passing through the RN Atomic Defence School about this new approach to life-saving First Aid training and the response we got and the apparent interest we aroused among officers and ratings was most heartening Indeed we felt we could commend it now for favourable consideration and implementation to the medical officers and sick berth staff of the Royal Navy We do not suggest for one moment that it is not desirable to have a nucleus of personnel fully trained in First Aid but we believe that it is a matter of greater urgency to ensure that **everyone should know how to save life in an emergency.**

(I am indebted to Captain A H Swaun Royal Navy for his interest and co operation in the preparation of this paper)

AN ANALYSIS OF THE HUMAN REASONS UNDERLYING THE FAILURE TO USE A CONDOM IN 723 CASES OF VENEREAL DISEASE

By Surgeon Captain H E. B Curgel, RN (Rtd)

Venereal Disease is still a big problem in the Far East Fleet In view of the world wide trend towards increase of Venereal Disease especially among younger people a spontaneous reduction in the number of naval cases does not seem very likely Surgeon Vice Admiral Sir Sheldon Dudley s dictum Venereal Disease is an occupational disease of seamen still holds good

It has been assumed since the earliest times that very many lusty tars separated from their homes and from ordinary social intercourse with women will fornicate This tendency has been recorded in sea song and story until it has become woven into the very fabric of our history

The young sailor of today coming to sea for the first time cannot fail to observe that the official expectation is still that he will fornicate Unlimited supplies of condoms are made available to him on demand and by lecture and notice he is encouraged to make use of them He is soon made aware of the location of the brothel areas when he is told that they are out of bounds and that he must not go there

Prevention of Venereal Disease

The question of whether or not an individual is going to fornicate is such an intensely personal one that it is not very likely to be influenced by sermons or lectures of any kind While the social and moral advantages of continence before marriage and faithfulness after must be stressed the most important duty of all naval welfare workers should be to try to educate the would be fornicator in sexual lifemanship so that he can at least escape the anti social by products of his acts These by products are Venereal Disease and illegitimate babies Since the calomel cream dreadnought is no longer used and the ablution chambers have been closed down the only really practical method of protection is the use of the condom

Reasons why the Condom is not used

On the front of the F Med 16 (Venereal Case Card) there are two boxes each postulating a question No 16 says Prophylaxis used If any)? and No 18 says Under the influence of alcohol?' Since the answer to No 16 is almost invariably 'No and the answer to No 18 is very often Yes these two answers have tended to be linked together into a close association the implication being that the sailor goes ashore having a condom in his pocket but at the time of coitus is too much under the influence of alcohol to be capable of using it The writer has long held the view that while this may be true in some cases there are many more important reasons why the fornicator does not use the condom

The Present Investigation

It was thought that if the nature of these human reasons could be established, it might be possible for Medical Officers when giving their lectures of VD in the training establishments to emphasise certain points yet more forcibly

A questionnaire was prepared containing 10 possible reasons for not having used a condom Space was left at the end for any other reasons and for any suggestions which might be effective in preventing young men from getting VD These questionnaires were distributed throughout the Fleet and Medical Officers were invited to encourage as many patients as possible to complete them On the form there was nothing to identify the man who was giving the answers and it can be fairly assumed that the forms were filled up willingly and that the information given was reasonably honest and sincere

The period chosen was from April 1st 1963 to June 30th 1964 and during this time a total of 723 completed questionnaires was received During the same period over 2 300 cases of VD were officially notified to the Naval Medical Officer of Health The reasons for the discrepancies in numbers are not known for certain but it is probable that many of the cases occurred in small ships which did not carry a medical officer at the time of the onset of the VD and that the LSBA did not feel justified in pressing the patient to complete the form or among the Royal Marines on active service in Borneo who had little time for such things

During the same period 186 500 condoms were issued by the RN Medical Depot in Singapore There is no way of knowing what happened to these condoms how many were used in extra marital intercourse how many were appropriated by the married men how many were used as a means for barter and how many were lost

The Results of the Questionnaire

In the 723 completed questionnaires there were 879 answers This was because some men recorded more than one human reason for not having used a condom A common combination was the two admissions that he had no reason to believe that his partner was suffering from VD and that he did not intend to spoil his pleasure

The bare statement that he just had not got a condom with him was only recorded if it was unqualified in any way

As regards the influence of alcohol the statement that he had one but did not use it because he was under the influence of alcohol was recorded in 140 cases In the question 'Any other reason?' alcohol was referred to in 39 cases This was taken to mean that his restraining influences were removed by the alcohol that he found himself in a devil may care mood that he desired sexual intercourse and was prepared to seek it out and have it regardless of the consequences and without going to the trouble and expense of providing himself with a condom

The Reasons in Detail

1 You just had not got a condom with you This produced the greatest number of answers 263 (29%) This just represents basic carelessness and it is not likely to be altered by any amount of lecturing

2 'You did not think that protection was necessary in your case [illegible] you hoped or believed that your partner was not likely to be infected' This produced the next largest number of answers 200 (23%) It is considered that this human reason is of great interest and leads itself to forceful lecturing. The old time sailor was a realist He called a spade a spade and a whore a whore. He did not glamourise her or have many false sentimental or chivalrous illusions about her The modern young man's conception of the sexually promiscuous woman has become somewhat blurred round the edges In this he has not been helped by the modern trend in theatre film TV or novel in which sexual promiscuity has become glamourised and the promiscuous woman is represented as being amusing and intelligent as well as being physically desirable. Examples are novels such as 'The World of Suzie Wong' and films such as 'Never on Sunday' Wanchai as a centre for vice is freely referred to in travel advertisements the invitation to 'Visit the World of Suzie Wong and more' The brochure for a round trip Singapore/Hong Kong put up by a Singapore travel agency specially for Servicemen ('A Colonel's Holiday on a Corporal's Budget') includes as one of the attractions for the third day 'You pass through the famous Suzie Wong district of Wanchai with its countless bars and sing-song girls the vice riddled haunt of the underworld

3 'You had a condom but did not use it because you were under the influence of alcohol' This produced 140 answers (16%) It is unlikely that lecturing on this particular point will bring about any very dramatic results

4 'You did not want to spoil your pleasure by using a condom' This produced 126 answers (13.5%) The frank sensualist is not very likely to be influenced by lectures

5 'You had sexual intercourse with the same partner several times in the same night but only used a condom on the first occasion' This produced 59 answers (6.5%) This point of view is worthy of forceful lecturing but it is not very hopeful that much will be achieved To be protected against this eventuality demands a degree of careful forward planning which it is most unlikely that the average sailor will achieve

6 'You believe that modern drugs and treatment are so effective that VD even if you get it is cured easily' This produced 42 answers (5.5%) This comparatively small number was rather surprising as it had been anticipated that the efficiency of modern treatment would have been accepted as an easy reason for not worrying about getting VD This point can well be referred to in lectures but it will need careful handling lest any doubt in the efficiency of modern drugs is left in the minds of the listeners What should be stressed is that **even** with the use of modern drugs the treatment of VD is time consuming and that multiple attacks following each other at short intervals are still a real therapeutic problem.

7 'You did not know that the use of the condom is a most effective form of prevention of VD i.e. no lectures on the subject' This produced 24 answers (3.4%) It was most surprising to get any answers like this at all observing that all young Servicemen should get basic VD lectures at some time during their training This point clearly requires very forceful lecturing

8 Your religious beliefs forbid the use of a condom This produced 17 answers (1 9%) I am informed by the Roman Catholic chaplains that the use of a condom, even by the fornicator having sexual intercourse with a prostitute is forbidden by the Roman Catholic Church This aspect is clearly outside the scope of a medical lecture

9 Your partner refused to let you use one or laughed you out of using one! This produced 7 answers or (1%)

10 She would have charged more money if you had worn one! This produced one answer (1%) The Oriental prostitute obviously does not mind In other parts of the world to be charged extra for wearing a condom is fairly common

Answers to the Non Standard Questions

Question 11 was "Any other reason?" and Question 12 was "Any other suggestions which might be effective in preventing young men from getting VD" It is proposed to deal with the answers to these questions separately from the foregoing ones The percentages recorded refer to questions 11 and 12 only

Question 11 A total of 67 reasons were recorded in answer to this question. These can be grouped under various headings

a.	Influence of alcohol	39	(58%)
b	No intention	11	(16%)
c	Fed up'	4	(6%)
d	Misplaced faith in partner	4	(6%)
e	Various mechanical reasons	4	(6%)
f	Other miscellaneous reasons	3	(5%)
g	Failure to collect before going ashore	2	(3%)

Question 12 A total of 80 suggestions was received These were of great interest in giving some insight into the views of the man in the street

a **Various moral precepts** 22 (27 5%) These though they may have been sincere had a somewhat hollow ring about them Examples "Stay sober and use sheaths Don't be misled by pretty girls" Because the girl and the bedroom looks clean it is not always the case In fact I would say that the clean looking girl would attract more men and therefore have more chance of contracting the disease'

b **Controlled Brothels** 18 (22 5%) These were generally referred to as Admiralty or State run and it was expected that Naval Medical Officers would look after them Examples "Run a brothel abroad by the Navy Girls should carry health cards" "Nationalisation of brothels and a regular check up Certain addresses be legalised especially in Singapore and Hong Kong "The necessary checks could be made even by RN Medical Officers if the pressure of their work would allow it Have never had any trouble in the appropriate bars"

This subject is a most important one for forceful lecturing. The layman still clings tenaciously to his belief that the controlled brothel will 'make fornication safe for democracy

c **More Instructions** 11 (13 75%) The plea was generally for more films This was often further qualified by the word "American

d. Compulsory of regular 'issue' of condoms 6 (7.5%)

e. Alter present methods of making condoms available to libertymen 5 (6.25%) Examples QM or Duty PO keeps supply Issue each man with three at [illegible] Have condoms available at main gate or gangway

f. Show pictures of extreme cases 5 (6.25%) Forceful lecturing against this Chamber of Horrors approach is indicated

g. Better Recreational facilities for sailors on foreign stations 3 (3.25%) In view of the anonymity afforded by the questionnaire more suggestions in this group were expected Two made somewhat bitter comparisons between the lives led by officers and ratings in the Far East. One said 'Have a ratings' bar on board so that when we go ashore we do not have to go and get drunk Therefore when we do go ashore the urge for beer and women is not so strong

h. Geographical 4 (5%) These suggestions emanated from one ship which after a long period in the Persian Gulf was sent to a place where there were bright lights and plenty of women from whom they contracted many cases of VD just before they went home The wording of the suggestions was 'Don't send ships to East Africa after the Gulf' There is nothing practical in this suggestion as these places which offer good facilities for final rabbitting also offer them for fornication

i. Punitive measures against those who contract VD 2 (2.5%)

j. Prophylactic Ablution Centre on board for Far East Station 1 (1.25%)

k. Make no Anti VD Cream 1 (1.25%)

l. Stronger Condoms 1 (1.25%)

m. Misplaced fear of punishment 1 (1.25%) One man said 'Cut out all punishment where VD is concerned then people would come to the Sick Bay as soon as they even think that they might have something At the moment people will not report to the Sick Bay for fear of punishment and they go ashore and spread the disease' While this answer probably represents the muddled thinking of one man it is possible that this is an 'old wives tale' which has some support on the lower deck It might be as well therefore to include in all VD lectures a clear statement of the 'penalties' which from the social point of view are involved when a naval rating gets VD

The Branches of the Men Concerned

In this series the distribution of the branches were as follows

Seamen	253	Royal Marines	36
Electrical	133	Petty Officers	33
Engineers	129	Chief Petty Officers	4
Supply	77	Musician	1
Air	57		

The Married State of the Men Concerned

Married	185	Single	538

The Age Groups of the Men Concerned

Age in years	Number of cases	[illegible]	[illegible]
16	1	1	
17	27	3 7	
18	79	10 7	6
19	106	14 6	6
20	91	12 5	6
21	69	9 5	6
22	59	8 1	6
23	66	9 1	64
24	70	9 6	7
25	41	5 6	5½
26	31	4 2	
27	18	2 4	
28	16	2 2	
29	12	1 7	
30 and over	37	6 0	

This table shows that the hot blooded young men in the age group 18 to 25 provided 79 7 of the cases in this series whereas the percentage of these same age groups in the Navy as a whole is only 49% (figures supplied by the Naval Manpower Statistics)

Summary and conclusions. The human reasons underlying 723 cases of VD in which the patient failed to make use of the condom are analysed The three main reasons appear to be

1 Carelessness
2 The influence of alcohol This acts in two ways Firstly by removing the ordinary social controls so that the man seeks sexual intercourse and performs it without any thought for the consequences Secondly in the more advanced alcoholic states by making him physically incapable of using the condom even though he may have had one in his possession
3 Misplaced faith in the bacteriological cleanliness of his partner

Possible Antidotes to these influences on the Far East Station

In these comparatively affluent days the average young sailor has enough money all the time to drink heavily if he wants to The best antidote to this is to offer him all those things which fill his days with worth-while interesting pursuits and to help him to avoid boredom It is a sad fact that once they have left England for their foreign commission most young sailors have few chances of having ordinary social contacts with English girls of their own ages and outlooks Unless they choose to live a semi-celibate life they are forced to seek their feminine companionship, not necessarily in the sexual sense from Asian girls

The Divisional activities the Ex Fed organisations the Youth Clubs run by the Churches and the Royal Sailors' Rest all play their very valuable parts but it

is thought that the ordinary married accompanied families could do very much more than they do at the present time in the way of adopting for the duration of the commission one or more young men from the Fleet and in this way bestowing on them that gift which costs so comparatively little and which means so much that of being an up homer

In contrast to her rather be-draggled and unsavoury Western sister, the Eastern prostitute is so often physically charming and gay in her manner that the young man may be forgiven for being overwhelmed by a flood of misplaced chivalry As one Chief Petty Officer under treatment for Syphilis contracted after his one lapse in Japan some years ago told me sadly Trouble is Sir they serves it up so dainty

Lectures should in some way give a sort of documentary on the life and working conditions of the prostitute on the lines of This is Her Life and must put over the idea that the promiscuous woman by virtue of the kind of life she leads voluntarily or under economic pressure is most unlikely to remain uninfected for long The sailor must be made to realise that far from being the chosen individual lover he is generally nothing more than a casual unit on a sexual conveyor belt

In these days of Television when the appeal is all to the eye the use of the film as an adjunct to the lecture is very valuable Hitherto the Navy has had to make do with films made by other Services and indeed by other nations I would welcome a really good VD propaganda film made by the Navy especially for the Navy It would be a most valuable addition to our armamentarium

I should like to express my grateful thanks to all the Commanding Officers of ships and establishments and to the Medical Officers and to all the anonymous patients who so kindly gave me facilities for collecting the material for this paper

A PORTABLE DENTAL SURGERY FOR FRIGATES AND OTHER SMALL SHIPS

By Surgeon Captain (D) K. A. Johnson, RN

The new modern Navy is demanding new ideas and like other branches the Dental Services have to meet this change

Large ships requiring a full time dental surgeon with a fully equipped conventional surgery are now few the emphasis is on the small units with complements of some two hundred and fifty

Over the years dental officers of the armed forces have been searching for the ideal portable equipment whereby dental treatment may be brought to the patient There are several variations of a small dental valise containing a few pairs of forceps and some oil of cloves these were the standby of the early medical officers in the Army Later the Army designed the Field Unit and a somewhat similar portable outfit was adopted by the Navy It was never a complete success Although described as portable it was too heavy to move by hand During the last twelve or thirteen years it has gradually been modified until by normal evolution the present Frigate Portable Dental Surgery emerged

The concept of the Frigate Portable Dental Surgery was that it had to be sufficiently robust to stand the move from ship to ship be light and compact enough





[illegible]

to be reasonably portable and yet be stable It had to provide the requirements of one dental surgeon for three months The present outfit exactly meets these specifications but is not designed for other than routine conservative work and simple extractions It in no way supplants the conventional dental surgery

It comprises two cases the upper fitting securely on the lower The upper case measures 26in long 16in wide 17iin high when fully loaded it weighs 114lbs The top surface is designed to take a Kavo engine Saliponmp and Amalgamator as well as being a working surface it is fitted with drawers and biddles The lower case measures 26in long 16in wide 23in high fully loaded it weighs 189lbs This section is the bnlk carrier it holds the larger items for transit and in it is fitted the electric socket panel The Micro Turbine too is housed in it and its weight acts as a stabiliser

The Frigate Portable Dental Surgery has been used frequently during the last eighteen months in home waters and in the Persian Gulf It has proved invaluable and as many man hours are saved is gaining much popnlarity with Commanding Officers When the work in one ship is completed transfer by jackstay is a simple exercise

It was demonstrated at the Annual Conference of the British Dental Association held in London this Summer and has given many dental surgeons in varying fields much food for thonght

SICKNESS IN A MARINE COMMANDO ABROAD

By Dr John T. Harries (formerly Surgeon Lieutenant, RN)

This is a survey of patients seen by a Medical Officer during a 10 month attachment to 45 Commando RM based in Aden. The numbers represent those patients seen in the bay by the doctor. There were many treated by senior sick berth attendants especially on exercises and up country who did not see a doctor. Numbers therefore do not represent the total sickness in the Commando. A small diagnostic survey of men seen by an LSBA in an up country detachment is included. All were 'fresh cases' i.e. men presenting with a new complaint.

Appointments were unaccompanied and for a period of one year. Most accommodation was air conditioned but crowded and inadequate in many respects. Men lived under canvas during their time up country.

On arriving at the Commando all men were given printed advice on precautions applicable to a tropical climate. This was also propagated by regular medical lectures and periodic publications in Daily Orders.

During the year two weeks local leave was allowed. Kenya was popular especially the leave centre in Mombassa. Recreation available to all included cricket, rugby football, swimming, sailing, fishing and a nightly cinema performance. A library was also available.

No specific tropical diseases are endemic in the Aden State. Tuberculosis and traffic accidents are the main problems. Malaffiria, Bilharzia and the dermal variety of leishmaniasis are common in other states of the Federation. Shark attacks are uncommon and there is about one fatal attack recorded each two years in Aden state. Outside Aden State, the incidence is unknown.

A small air conditioned cabin containing three beds was made available as the sick bay ward.

Climatic Conditions

Generally speaking the climate is hot and dry in the winter and hot and humid in summer. Meteorological observation for years 1961 and 1963.

Maximum mean shade temperature in 1961 varied between 81.1°F in January to 95 F in July and between 80 F in January to 94.7 F in July in 1963.

Minimum mean shade temperature in 1961 between 73.5 F in February to 86.3 F in June and between 73.3 F in January to 87.4 F in August.

Mean relative humidity in 1963 varied between 66.3% at 3 p.m. in June to 76.2 at 9 a.m. in January.

Rainfall. Total in 1961 was 1.78in. and 2.8in. in 1963.

THE SURVEY

(a) *Total seen*

A total of 900 'fresh cases' were seen. Some patients were seen for a number of different complaints, each complaint comprising a 'fresh case'.

(b) *Average number of visits of each fresh case*

Average number of visits was 2.18. This figure represents the times seen by the doctor and not the total attendance at the sick bay.

(c) *Rank of patient*	*% of Total*
Marines	78 (700)
Sergeants and above	8 (73)
Officers	6 (55)
Corporals	7 (64)
Lance Corporals	1 (8)

(d) *Smoking*

Average cigarette consumption was 20 per day. Twenty seven per cent were non smokers. Of the 73% smokers 98% smoked cigarettes and 2% pipes. Cigarette consumption varied from an occasional one to 60 per day. All were specifically asked whether they were aware of the danger to health and all replied in the affirmative. Only 10% had made any attempt to reduce or abandon their smoking habits. Of this 10% only one man had succeeded in completely abandoning the habit. Fifteen men smoked 40/day, one smoked 50/day and three smoked 60 day.

(e) *Symptoms on arrival in Aden from U.K.*

Forty two per cent had symptoms referrable to the change of climate. Anorexia constipation, headache and lassitude were commonest. Ankle swelling and skin rashes were not as common.

(f) *Time of arrival of patients in sick bay*

Time of arrival	*Number and % of total*	*% of ranks in each group* *Officers*	*NCO's*	*Marines*
Official Sick Parade time	91	5	10	85
Before mid-day	3	31	15	54
Between mid day and 6 p.m.	3	9	10	81
After 6 p.m.	1	0	0	100

There was a high incidence of officers arriving before mid day after the official sick parade. The only rank seen after 6 p.m. were marines.

(g) *Disposal of patients*

Disposal of patients	*Numbers and % of total*	*% of ranks in each group* *Officers*	*NCO's*	*Marines*
Discharged to duty by M.O.	91% (820)	7	16	77
Referred for				
Specialist Outpatient opinion	7% (58)	4	21	75
Admitted directly to Hospital	2% (22)	9	9	82

Of the 91% who remained under the care of the Medical Officer and were eventually discharged to duty 54% were in no way restricted in their activities. Twenty six per cent were placed on light duties, 14% were confined to bed in their cabins and 6% were admitted to the sick bay ward.

Of the [illegible] referred to specialist out patients 29% were venereal disease 17 ophthalmic 16% orthopaedic 14% surgical 13% medical and 11% were ENT skin and psychiatric

Of the 2% admitted directly to the hospital, 50% were medical 28% surgical and the remaining 22% psychiatric and orthopaedic. Fifteen per cent (14) of the total patients seen were eventually transferred from the hospital to UK

(b) *Diagnostic classification*

Diagnostic Group	*Numbers and % of total*	*% of ranks in each group*		
		Officers	*NCOs*	*Marines*
Surgical	27% (249)	4	13	83
Medical	20% (177)	11	17	72
ENT	17% (156)	6	20	74
Dermatology	14% (130)	8	15	77
Orthopaedics	12% (105)	7	20	73
Venereal Disease	3% (27)	0	35	65
Ophthalmic	3% (24)	10	10	80
Psychiatric	2% (17)	8	21	71
Miscellaneous	2% (15)			

Surgical Group

Diagnosis	*% of group total*
Minor trauma and burns	69
Parouychias infected cysts and abscesses	13
Miscellaneous (e.g. haemorrhoids)	10
Appendicitis	4
Abdominal pain of unknown aetiology	4

More than half (55%) of the minor trauma and burns were infected. All the infected grazes and lacerations need a period of restricted activity, i.e. 46% were confined to bed for a time and 54% were placed on light duties

Eight per cent of the surgical group required minor operations which were performed in the sick bay

Medical Group

Diagnosis	*% of group total*
Gastrointestinal upsets	37
Upper respiratory tract infections	28
Headaches	11
Miscellaneous (e.g. epilepsy, hepatitis)	10
Pyrexia of unknown origin	6
Chest infections	6
Postural syncope	2

Of the gastrointestinal upsets 45% were gastroenteritis 28% were gastritis and 27% enteritis. Of the headache 20% were migrainous and 80% of unknown cause

Eighty-three per cent of the chest infections were bronchitis and 17 were pneumonia

E N T Group

Diagnosis	
Otitis externa	53
Acute tonsillitis	18
Wax accumulation	10
Otitis media	5
Sinusitis	4
Miscellaneous (e.g. polyps)	4

Sixty seven per cent of patients suffering from otitis externa had previous attacks and 59% were preceded by sea swimming

Dermatology Group

Diagnosis	*% of group total*
Boils	23
Non-specific skin rashes	14
Infected rashes (impetigo)	17
Fungal (mostly on feet)	14
Eczema	2
Warts	8
Reaction to injection and vaccination	3
Insect bites	4
Scabies	3
Acne vulgaris	3
Urticaria	3
Miscellaneous (pityriasis rosea herpes zoster)	6

Orthopaedic Group

Diagnosis	*% of group total*
Sprained joints	55
Low back pain	14
Fractures	12
Subluxations and dislocations	7
Miscellaneous	12

Sprained joints occurred most commonly in knee ankle and fingers Fractures were most common in skull hands feet and legs

Venereal Disease

Diagnosis	*% of group total*
Non specific urethritis	49
Gonorrhoea	22
Primary syphilis	7
Chancroid	4
Patients worried but shown not to be infected	18

Ophthalmic Cases

Diagnoses	[illegible] *p total*
Conjunctivitis	[illegible]
Refractive errors	25
Foreign bodies corneal ulcers styes Meibomian cysts etc	38

Two per cent were psychiatric and 2 miscellaneous (e.g. pain in testicle on examination nil)

(i) *Skin sepsis trauma otitis externa and gastrointestinal upsets*

Skin sepsis of all types accounted for 18% of total patients seen Trauma accounted for 26%, gastrointestinal upsets for 6% and otitis externa 13% These four groups accounted for 63% of total

Included is a small but interesting survey conducted by an LSDA during a 4 months period up country in Dhala with a company of Commando The men lived under canvas at a height of 5 000 feet

Total number of patients seen			750
Average daily sick list			6 25
Gastrointestinal upsets			127 (17%)
Heat illness			5 (06%)
Skin diseases	Boils 1%		36 (5%)
	Fungal infections 09%		
	Others (bites etc) 2 %		
Casevacs to Aden			6 (08)
Otitis externa			8 (1%)
Infected blisters grazes lacerations			83 (11)

DISCUSSION

There are a number of interesting facts in the survey which deserve further mention

Sixty-three per cent (571) men fell into one of the following diagnostic groups skin sepsis gastrointestinal upsets otitis externa trauma and it was these conditions which were largely responsible for the inability of 46% (400) to continue full duties following their first visit to the Medical Officer This could be an embarrassing figure in active conditions of war

Most of the skin sepsis could easily have been avoided especially by immediate local toilet of minor grazes and lacerations This is not appreciated by men arriving in Aden as the relative incidence of such sepsis in UK is low Infection of an innocent looking graze with lymphangitis and adenitis can occur with alarming speed in a hot humid climate completely immobilising a man Skin sepsis was particularly common on the feet and legs Contributing factors were poor hygiene ill fitting footwear delay in treatment of relatively minor blisters and contusions and trauma whilst wearing flip flops Improved body hygiene will reduce other skin sepsis such as boils and impetigo

Gastrointestinal upsets were common especially up country where a high standard of hygiene was difficult to maintain. In such circumstances great efforts are required by all and it is imperative that well trained hygiene NCO's be encouraged and supported by senior officers.

The relative incidence of otitis externa in the dry atmosphere up country compared with sea level Aden was extremely low. Swimming and humidity seem two important predisposing factors. A large number of this group became chronic attenders of the sick bay. Many had attacks prior to arriving in Aden and one wondered of their suitability for service in such a climate. I considered the most effective single factor in treatment to be regular thorough, gentle local toilet of the external auditory meatus.

It is difficult to know whether a reduction in the incidence of trauma is possible in such a physically active group of men, but certainly stress must be laid on physical fitness and prompt medical attention in reducing the time of return to full duty.

The surprisingly small incidence of heat illness in such a physically active community reflects I think:

(1) General physical fitness.
(2) Awareness of senior ranks to body requirements in such a climate.
(3) Proper acclimatisation of newly arrived.
(4) Availability of water and salt.

Most of the venereal disease was contracted whilst on leave in Kenya though there is a high incidence of gonorrhoea and syphilis in Aden.

Mental health compared with other Armed services in Aden was good despite (or because of) the post being unaccompanied and poor living conditions. This reflects on the general morale of the Commando and a large and successful participation in sport amongst other things.

It is interesting to note the large number of cigarette smokers and the small percentage who attempted to reduce their consumption when aware of the danger to health.

The only specific tropical disease encountered was a case of malignant malaria contracted in Kenya. The man had not been taking paludrine.

A large number of newly arrived men had not received any instruction prior to leaving UK on health problems specific to the area. It is considered important that they should.

A relatively high and alarming percentage of NCO's compared with other ranks reported with venereal disease (or thought they might have it) and psychiatric problems. These observations are a little difficult to explain. The NCO's live under far better conditions than marines. Perhaps they had more opportunity of contracting venereal disease.

SUMMARY

A survey of 900 'fresh cases' seen by a Medical Officer during a 10 month period attached to a marine commando in Aden. A large number of diseases preventing men continuing full duties are avoidable by prompt medical attention, medical

propaganda before and after arriving in such a climate and a high standard of physical fitness and hygiene

Incidence of heat illness was very small

Cigarette consumption was high despite awareness to dangers to health

A high incidence of venereal disease and psychiatric problems occurred in NCO s

ACKNOWLEDGMENTS

I should like to thank all the sick bay staff for their help in conducting this survey LSBA Brunsier for contributing the records from Dhala Dr Fawdry of Queen Elizabeth Hospital Khormaksar for information on tropical diseases in the area and Surgeon Captain S Miles for his suggestions

TREATMENT OF 137 CASES OF DECOMPRESSION SICKNESS*

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Summary

The treatment of 137 cases of decompression sickness is reviewed and the various routines used in treatment are compared. Special attention is paid to the recurrence rate after the initial treatment. Some suggestions are put forward for more efficient treatment using methods other than the traditional stage system of decompression from fixed pressure levels.

Introduction

During the course of the last decade the incidence of decompression sickness within the Royal Navy has markedly increased. Whereas in the past such cases were largely the result of accident or negligence and fortunately rare the testing of new techniques and tables has produced sufficient material to make some analysis of the various methods of treatment worth while. This paper consists of summaries of the histories of those cases treated by recompression in the Navy of which I have been able to find some record together with an examination of the effectiveness of treatment employed. The records used have been reports to Naval Medical Officers of Health, records of Courts of Inquiry, Hospital case notes and the reports of various diving trials. Unfortunately these are neither as accurate nor as detailed as would be desirable and many gaps exist in the reports. What proportion these cases are of the actual number which occurred is problematical, though I would think that most have been found. In all cases where it has been possible the information given has been cross checked between the various records. A total of 137 cases are summarised, of which 6 occurred before 1952. During 1962 there has been further experimental diving and more cases of decompression sickness some of them of considerable interest, particularly with regard to the management of the more serious cases. These however are to be reported separately and they do not affect any general conclusions drawn in this paper. Following the case summaries are some comments on the symptomatology, types of treatment and its effectiveness, then a brief discussion of the findings.

Symptomatology

The occurrence of skin rashes and itching has not been recorded in the case histories nor in the list of symptoms because it is so common that in very many instances it has undoubtedly occurred but neither been mentioned by the diver nor recorded by the medical officer.

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TABLE IA

CASES	SYMPTOMS	NUMBER
Group A	Pain in upper limbs	77
	Pain in lower limbs	26
	Pain in both extremities or limbs and trunk	22
	Pain in trunk	22
	Disorder of power	16
	Disorder of sensation	11
	Shock	8
	Nausea and sickness	7
Group B	Vertigo	6
	Headache	5
	Unconsciousness	4
	Disordered vision	3

TABLE IB

	No	
Patients exhibiting group A symptoms only	89	64 9
Patients exhibiting group B symptoms only	5	3 6
Patients having symptoms of both group A & B	43	31 4
Total	137	

Table I shows the preponderance of upper extremity bends in contrast to tunnel and caisson workers whose bends usually occur in the lower limbs The spread and combination of symptoms is very similar to that in the series by Van Der Aue Duffner and Behnke (1947) A further contrast with tunnel workers is the much greater number showing symptoms other than pain here designated group B — a third of the total whereas in the Dartford Tunnel series (Campbell Golding Griffiths Paton Walder and Hempleman 1960) only 5 per cent had such symptoms

Thus suggests that although some of the divers may have [illegible] described there the majority have a decompression sickness of the [illegible] the simple bends' but of a more serious degree. The group B [illegible] tend to be an underestimate since minor degrees of these disorders would tend to get neglected in the giving and recording of the history particularly in the presence of a severe pain and when rapid treatment has been applied. I am inclined to think that some degree of shock is much more common than it appears from the table. With regard to this I should mention that it does not seem to be routine practice in experimental diving for the diver to receive any blood pressure or pulse recording immediately before or after his dives or any other clinical examination apart from his ears which must detract from the value of any findings made in the course of investigating illness caused by the diving.

Types of Treatment

The various schemes of treatment are shown for reference purposes in appendices. The earlier cases were all treated according to BR155 43 which uses a multiple phase system also described in "Deep Diving and Submarine Operations" and is attributed to Haldane. All the later cases were treated by the American tables described by Van Der Aue Dnffner and Behnke (1947) or the British modification of them. In these latter tables oxygen breathing is treated as a bonus but is not used to shorten the time under pressure and the table 2A has been reduced from 4 hours at 10 feet to 2 hours. The first of these changes was made because it was felt that it was dangerous to surface directly from 30 feet after oxygen breathing and that anyway it was difficult in practice to keep anyone on oxygen for any length of time. The change in table 2A was made because it was thought illogical to have 4 hours at 10 feet on this table and only 2 hours on tables 3 and 4 (Crocker 1962). The Eaton modification of the British table 1 (Eaton 1958) was used once without success. With this system stage decompression has been avoided by a continuous leakway of gas from 100 feet. However the case on which is was used was too serious for a table 1 decompression to be effective and the failure was not surprising. The American tables were devised after a series of experiments described by Van Der Aue White Hayter Brinton Keller and Behnke (1945). They were tested on a series of 113 cases of decompression described by Van Der Aue Dnffner and Behnke (1947). Following these reports they have been very widely accepted throughout the world and have become hallowed by time and inclination in many diving manuals. There has not however been any other critical examination of their effectiveness as far as I know. The Haldane system of BR 155/43 used prior to their introduction was felt to be unsatisfactory because of a series of recurrences but there were no figures of statistical value to compare its effectiveness with the newer system when this was introduced.

The Effectiveness of Treatment

The effectiveness of the various methods of treatment are here judged by the rate of recurrence of symptoms requiring further recompression for their relief.

TABLE 2

TREATMENT	NO	RECURRENCES	
B 1 A 1A	42	9	21 4
A 1	21	4	19 0
A 2	14	4	28 5
A 2A	1	0	—
B & A 3 & 4	10	2	20 0
B 2	20	4	20 0
155/43	26	5	19 2
Other	3	2	—
Overall Total	137	30	21 9

Total A & B except B 2	88	19	21 5

B — British table A — American table

Note The British table 2 is listed separately because of the difference of the time given at 10 feet mentioned earlier

It will be seen that about one in five of all the cases treated by recompression require additional pressurisation and it does not appear to matter much which system is used The 20 per cent recurrence is surprisingly constant It is also interesting to note that of 24 incidents at Submarine Escape Training Tank, where these tables have been used 6 required further recompression (UPS 199 1961) The somewhat higher recurrence rate for American table 2 might seem to justify the British fears of the oxygen breathing tables but in fact it is doubtful if all the 35 cases recorded as treated by this system received oxygen and much more likely that they were decompressed on the longer air table and the explanatory A left out of the record

TABLE 3

TYPE	NO	REC	RATE
Cases treated on tables 1 or 2 with symptoms other than pain	35	11	31 4
Cases of pain only	65	11	16 9
Complicated cases apparently properly treated	8	1	12 5

The 35 cases of line 1 includes any in which the records indicate that even minor symptoms coexisted with the usual pain of bends. The increased recurrence rate of these cases suggests that such symptoms indicate a considerably greater severity of the decompression sickness and have a significance which may well not have been appreciated during treatment. It is also possible that rapid recompression has avoided the appearance of symptoms to be expected with a certain severity of decompression sickness, but that the degree of nitrogen over-saturation becomes apparent by resistance to treatment on the briefer tables.

TABLE 4

TIME OF ONSET OF SYMPTOMS	NO.	RECURRENCE	%
During decompression or immediately on surfacing	43	9	20.9
Within ½ hour	19	8	42.1
½ to 1 hour	11	1	—
1-2 hours	14	3	21.4
2-4 hours	7	1	—
4-6 hours	8	—	—
6-8 hours	3	—	—
8-10 hours	—	—	—
10-12 hours	3	1	—
12-14 hours	—	—	—
14-16 hours		—	—
16-18 hours	1	—	—
18-24 hours	—	—	
Total	109	23	21.1

Only in 109 cases has the time of onset of symptoms been recorded but judging by the recurrence rate these are a fairly representative selection. It is a little surprising that cases with symptoms presenting soon after surfacing appear to be more prone to recur than those occurring during the decompression or immediately at the surface. It would be interesting to tabulate the recurrence rate according to the time interval between onset of symptoms and return to pressure but nowhere is this information available.

DISCUSSION

Although some recurrence rate must be inevitable there can be no doubt that an average of 20 per cent is too high By recompression and subsequent prolonged decompression it is not only bubble effects which are treated but a general state of nitrogen supersaturation and while treatment must be based on the clinical state of the patient and his response to the treatment this itself is by no means an accurate indication of the extent of the saturation Nevertheless it is possible to achieve better results than these

It can be argued that the tables have not been properly applied and this has certainly been so in many instances. But even when used with rigid exactitude for the most straightforward cases there is still a high recurrence rate However any scheme of treatment must stand or fall by the results it achieves when interpreted by those for whose guidance it has been designed in this case by supervising diving officers and medical officers The tables tend to make the management of a case of decompression sickness appear easier than it often is and of course they can give no help with the diagnosis of the many apparently minor symptoms which may complicate the normal picture of a case of bends

The most obvious illogicality of these tables is their adherence to a staging system of decompression Staging was introduced into diving as the best practical method of approximating to the curve of nitrogen elimination but it has little point when using a recompression chamber Either a system of multiple phases or a continuous leakaway would be more preferable I suppose that stages have an advantage for the unskilled operator at an RCC but the inexperienced should not be attending those with bends Anyway valves which are capable of being pre set should be an integral part of any chamber It seems quite extraordinary that such expensive therapeutic equipment should not be thus furnished more often for if it is worth having at all it should surely be properly equipped The prolonged soak at 30 feet which is generally assumed to be the strength of tables 3 and 4 could equally well be embodied in a system which did not employ rapid fluctuations of pressure change at other pressures

The advantages of using a continuous leakaway of pressure instead of stages has been demonstrated by W J Eaton (1958) in his series of 110 cases of decompression sickness in goats Using a similar time schedule to table 1A (American) he has virtually eliminated recurrences when treating simple bends in goats Since the publication of this paper he has treated many more with equal success This is surely very relevant to the treatment of bends in divers and I feel sure that the potential benefits of using such a technique have been insufficiently recognised

The system evolved by P Griffiths for the treatment of bends in Tunnel workers (Campbell Golding, *et al* 1960) in which the minimum effective therapeutic pressure is employed enables him to treat his type 1 cases in an average time of 2 hours with a negligible rate of recurrence This method minimizes the contribution that nitrogen absorbed during treatment may make to the recurrence of symptoms Most cases of simple bends treated on the present tables could have avoided 30 60 minutes at an additional atmosphere of pressure

These two series show how better results can be achieved with other methods and indicate the sort of possible improvements in treatment which should be tested. The Haldane and American systems appear to have a similar degree of effectiveness, if judged by their recurrence rate in the cases here presented. The best feature of the former is its relatively even release of pressure and of the latter its longer time schedules at lower pressures. These should be combined in a new set of scales for therapeutic decompression. The Griffiths concept of "minimum" effective pressure could also be used with such scales in the treatment of limb pain only, though where other symptoms coexist such as those listed in group B of table 1, immediate resort to high pressure should remain in the standard treatment for there is considerable evidence to suggest that such symptoms, vague though they may be, indicate that the decompression sickness is of a much more serious degree. In this series they have nearly double the recurrence rate of the more straightforward bends. Recent experience has also shown how an initially effective pressure may be insufficient to prevent the recrudescence of serious symptoms (Mackay, 1962).

To sum up, I would suggest that because the tables at present in use are unsatisfactory, future therapeutic decompression should be experimentally conducted in an effort to achieve a more effective system, and that a new set of decompression scales be devised combining multiple phases of pressure relief or, even better, a continuous leakaway with the time schedule of the present tables. With the most straightforward cases of uncomplicated bends the minimum effective pressure could be employed. By these means it may be possible to make therapeutic decompression more effective and ultimately a briefer and less arduous procedure than it now is.

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VISIT BY THE MEDICAL OFFICER-IN-CHARGE ROYAL NAVAL MEDICAL SCHOOL TO FRENCH NAVAL MEDICAL ESTABLISHMENTS 6th - 16th OCTOBER, 1963

Sunday Arrived le Bourget, Paris at 1700 Met by le Médecin en Chef de 2ème Classe Cnret who with his wife took me to supper at the Cercle Militaire (U S Club) followed by a drive round Paris The Clnb resembles the Nnffield Clnb in Portsmonth bnt is somewhat grander and certainly less formal

Monday Escorted by Dr Cnret who had been detailed to accompany me through ont my stay in Paris, to the Hotel des Invalides to call on the General in charge of the Medical Services le Medecin General Debenedetti, the Directenr dn Services de Sante des Armées This officer who speaks very little English, is the head of the combined medical services He is a proud possessor of an OBE

Le Médecin Général de lere Classe le Breton head of Naval Medical Services was unfortunately absent for domestic reasons I did however have the opportunity of visiting his office and meeting members of his staff The headqnarters of the medical services is established in the Hotel des Invalides, an ancient building now largely nsed as a war mnsenm The offices occnpied by the Medical Department are spacious and tastefully equipped with period furnitnre and one is conscious of a deep emotional inflnence as if the spirit of France is very mnch a part of this historical environment

Pictnres of former battles and trophies from the Colonial Empire, swords badges spears ships wheels etc decorate the walls Behind the Director's desk is a rather nninspiring colonr print of President de Gaulle

The impact of the deep traditional atmosphere of the headquarters was to remain with me throughout the tonr and helped considerably in understanding much of the psychology of my hosts

Formalities over I was taken to the headquarters of the French Atomic Energy Organisation the Centre D Etudes Nucleaires de Fontenay Anx Roses

Althongh this establishment is on the ontskirts of Paris in many ways it resembles Harwell It is bnilt in the modern way on an area which once held a fort designed for the defence of the city It consists of reactors, physical research laboratories classrooms and a medical centre. The morning was spent visiting the medical centre and having the establishment explained Attached to the nnit was one Naval medical officer His interest was primarily concerned with the proposals to have nuclear snbmarines in the French Navy which was to them a particularly exciting project The first was expected in four years

The medical centre was well equipped for screening and documentation for all persons employed in the establishment and the treatment of any possible mis

hap Conventional monitoring apparatus was installed but the decontamination facilities were most impressive consisting primarily of a battery of long baths np ended to form showers Each could be hinged down to become a long bath Plastic materials were used throughout Although facilities were first-class in this respect, one soon had a sneaking feeling that the safety organisation was not as severe as in this country Every effort seemed to be directed to the efficient treatment of accidents rather than their prevention though radiological protection techniques were generally speaking much the same as in the U K with similar documentation A full range of documents used was given to me and is available for inspection There is a central Health Physics organisation and the term Health Physics is maintained It is compared by them with other Anglo American terms which had crept into their language such as Self-Service Striptease etc

I was entertained to lunch by the Superintendent of the establishment Dr M Ancien and senior members of his staff This was a formal lunch typical of many to follow with five courses and a variety of wines

In the afternoon visits were made to research laboratories and two reactors— Triton which was a water filled one rather like Lido at Harwell and Zoe one of the earlier ones Zoe was actually constructed in 1948 and is housed in a red brick building It is no longer effectively used but there is some uncertainty about its activity and it is treated with a great deal of caution

After a final session with champagne at 1630 I was taken to the headquarters of medical research the Direction Central du Service de Sante des Armees where a full explanation of the organisation was given to me by the second in command Medecin Colonel Gerbal The Naval medical officer on his staff and possibly my opposite number as Director of Medical Research was le Medecin en Chef de la Marine Dr Roger Boison

Under a common Director who at the moment is an Army Officer Medecin Général Debenedetti are four divisions equivalent to Army Marine Forces the Navy and the Air Force each with its own Chief — in the case of the Navy le Medecin Général de 1ere classe le Breton The organisation as a whole appears to be well managed and efficient. There is however a little uneasiness in the Naval Medical Service that the whole organisation is being swamped by the Army influence Theoretically the overall Chief can be appointed from any Service and they are hoping that the next one will in fact be Naval. If this is the case the Navy will be well content but it might well be otherwise

France is for administration divided into three regions each with a Commander in Chief and a Medecin Général 2ème classe (equivalent to a Surgeon Rear Admiral) based in Toulon Brest and Cherbourg An additional Medecin Général 2ème classe is in charge of the Naval Medical School in Bordeaux.

Problems of teaching and research are very similar to our own They have however no equivalent to our R N P R C though a certain amount of work is done by civilian contract Within the Services there are exceptionally good facilities for medical research There is a marked eagerness to exchange ideas and

results with the British Naval Medical Service. There is no shortage of American literature.

Tuesday. The first visit was to the Military Hospital Percy, also on the outskirts of Paris. The first department visited was the Services Centre for blood transfusion. This was a self contained unit in which blood was taken and bottled. Electrolyte solutions and other blood derivatives were also produced. The reception room where donors gave their blood was so designed that they sat in comfort outside a chamber into which they inserted their arms for withdrawal of blood. They were unable to see what was going on inside the department and the whole outfit was described by the personnel in charge as the 'Confessional'.

The officer in charge of this establishment was Medecin Colonel Maupin. He was obviously proud of his unit and was himself an authority on blood platelets and presented me with many reprints of his original papers as well as a considerable amount of data on his organisation. To encourage donors to come again attractive little badges are given according to the number of donations. A small red cross being the first award for 10 litres.

An interesting haematological test has also been developed in this establishment known as the thrombo elastograph which measures automatically in a sample of blood both clotting time and the elasticity of the clot. As in this country the French are in the process of turning over from glass to plastic containers.

Also in the hospital Percy is a burns treatment unit which claims survival rates in patients with as much as 50 per cent surface destruction. The main principle is one of isolation and barrier nursing following complete immersion washing and antibiotic therapy. During periods of complete isolation beds can be brought to the observation window where patients can talk to friends and relatives through a two-way microphone and loud speaker system. I was a little surprised to find that after the bath the patients were dried on sterile towels. They admitted that hot air driers would be preferible but these were not available. A complete self contained air purification system was also an integral part of the unit.

A further formal lunch was enjoyed at the hospital and the afternoon was free. A Naval medical officer Médecin en Chef 1ème classe Berroche is attached to the transfusion unit.

Wednesday. After a comfortable over-night train journey the sleepers being far more comfortable and far quieter than in U.K. I arrived in Toulon at 0730 to be met by Medecin en Chef 1ère classe Gestat who was to be my guide in Toulon. At 0930 with sword and medals (worn more often during this trip than ever during the past five years) I called on Medecin Général de 2ème classe Picard the Senior Medical Officer of the region followed by a formal call at the Prefecture Maritime to pay my respects to the Chief of Staff in the absence of the Admiral this was Capitaine de Vaisseau Dupont.

Formalities over I visited the Naval Hospital of St Anne' which was a well equipped General hospital of some 500 beds. The first call was at the department of Re animation (resuscitation). Here were a series of wards specially designed

to treat acute medical emergencies resulting from asphyxia e.g. gas or barbiturate poisoning, etc. Conventional resuscitators were available but what was most surprising was a complete lack of any facility for external cardiac defibrillation. This lack was well appreciated by the head of the department Medecin en Chef de 2ème classe Mathe who stated that funds were just not available.

A tour of the rest of the hospital was made, one of the most interesting and progressive departments being that of Virology. The hospital also had an interesting museum with many relics of former days, particularly of tropical interest from the days of the Colonial Empire.

At a formal lunch with the Medecin Général the commandant of the hospital Medecin en Chef de 1ère class Fuchs and other members of his staff were met.

The afternoon was spent in a visit to the Naval Air Station at Hyéres. This was very much like any other Air Station with the Sick Quarters and emergency medical organisation well prepared for any accident. The SMO here was Medecin Principale Marcandier. I was however escorted to this establishment by one of its former SMOs Medecin en Chef de 1ere classe Bathias. The first call was to the Commander of the Station Capitaine de V. Laure. Monsier Bathias who spoke no English turned out to be an exceptionally friendly and interesting host, quite immaculate in dress, manner, appearance and charm. He drove an English open coupe and took us along the coast in the evening and entertained me with his friends to dinner.

A tour such as this in unfamiliar country with a far from adequate command of the language appeared to me to begin with as a rather frightening adventure but I was very soon made to feel at home due entirely to the kindness and warmth of welcome of my French colleagues. This friendly atmosphere continued throughout and was without doubt the most satisfying experience of the whole period.

Thursday. After being picked up by Dr. Gestal I was driven round the Dockyard which seemed to be remarkably active and to have far more ships alongside than is customary in Portsmouth. The rest of the morning was spent at the Centre for Psychological Studies and Research with its most enthusiastic Director Dr. Caille, Maitre de Recherches des Services de Sante des Armées. Dr. Caille was medically qualified and considered that this was essential for all psychologists and that to be in uniform gave him the further advantage of being able to study his subjects at sea and during their normal duties. He maintained a complete dossier for every man in the Service and used an automatic punch card system for his sorting. As well as the usual aptitude tests every rating had an EEG, ECG, respiratory measurements and a record of eye movements. More data was being collected than his present staff could cope with but this was building up into a useful source which could be got at quite simply when required. Amongst his many excellent research facilities was a large sound proofed room with 30 odd loud speakers from which with an electronic noise-producing apparatus he could make white noise and any additives which might be required. He was at the time particularly

interested in the protective effects of various ear muffs and means of communication by transistorised telephones while they were being worn.

Near to the school were two old cruisers which were used as classrooms for various courses of instruction. These were visited with Dr Caille for a forenoon champagne. This was followed immediately by lunch on the diving research vessel Alimaniere to meet the personnel of the Diving School. After a fairly heavy lunch a visit was paid to the diving unit, Groupe d'Etudes et de Recherches Sous-Marine for discussion with the Medical Officer Dr Bartholomew on physiological problems of diving. They were particularly interested in the progress and achievements of the British divers and their own most valuable contribution was the efficiency of their own underwater breathing apparatus. Bartholomew and one of his civilian colleagues had been in attendance with Cousteau on his recent long exposure underwater residence. They were not impressed with Cousteau's physiological backing and considered that the mixture which he used ie 10% oxygen 45% helium and 45% nitrogen was too dense for such prolonged exposure.

Though they had very few bends to treat in their own divers, they were considerably worried by the load placed on their resources by amateur civilian divers who frequently ran into difficulties and demanded treatment at the Naval unit. They had considerable experience in transporting cases of decompression sickness in one man chambers to their treatment centre. This they had found unsatisfactory because the inevitable movement during transport seems to precipitate bubble formation. Unlike most of the other French Naval units I had visited this group produced beer to drink in the afternoon which was exceptionally welcome. (The weather during this period was very warm and sunny and the frequent lavish consumption of wine produced a thirst which was often difficult to slake. Many a time a pint of cool beer would have been most welcome. On the other hand the limited fluid intake which wine drinking entails probably accounts for the reluctance of these French officers to visit the toilet and I frequently found myself in difficulties through this lack of facility to which one is so accustomed in this country!)

The second half of the afternoon was spent with the Submarine Medical Research Unit. Commission d'Etudes Pratiques des Sous-Marines. This was in the charge of a Pharmacist Le Pharmacien Chemiste en Chef de 2eme classe Badre. One of his staff Dr Guillerm had visited the Royal Naval Medical School some years ago. Their problems were very much the same as those in the British Navy and they were looking ahead particularly to the time when they would have a nuclear submarine. One of their most active research projects was into the composition of tobacco smoke. In an attempt to try and isolate its harmful ingredients they felt carbon monoxide was by no means the only hazard. Amongst the techniques used for investigation was gas chromatography.

Further development of this unit which was demonstrated very effectively by a perspex model was the means of enhancing the effectiveness of aerosols by vibrating the source. Without vibration aerosols were seen not to enter the orifice

of the artificial sinus but once the source was shaken to a frequency of 100 cycles per second there was immediate entry of the aerosols in the cavity This method is now used throughout French Naval Medical Establishments for all upper respiratory tract infections where the use of an aerosol is indicated A report of the method was supplied and is at present being studied by our own specialists

A thermostatically controlled chamber was available for atmospheric studies

One of the kindest people in Toulon was the Médecin Général's Secretary Médecin de la Marine Borel, who entertained me that evening at his home to meet his family

Friday After visiting the Médecin General and his staff at their headquarters Dr Borel drove me in the General's car along the coast to St Tropez returning by an inland route through the forest

Also in Toulon is a very attractive Naval Club Cercle Naval which has facilities for officers and their families for entertainment meals and drinks and some games. It is cosy attractive and very friendly One of my hosts told me however that the club tended to be monopolised by a number of retired Senior Naval Officers who could not drag themselves away from the environment He assured me that when he retired he would get as far away from the Navy as possible. This is a problem which I am sure is common to both our Navies

(At the informal meetings with members of the French Naval Medical Service at the Club and at their homes it was possible to get a very good impression of their attitude towards the Service and also to discuss with them the problems in our own country There are approximately 400 doctors in the French Medical Branch with two equivalent Vice Admirals and five equivalent Rear Admirals and twenty equivalent Senior Surgeon Captains This seems to be a generous quota of Senior Officers but the name of Médecin Général rather than Admiral may make this a more acceptable arrangement Their system of promotion is very similar to ours depending for the high ranks on selection and as a result they suffer just as much as we do from promotionitis or Ague d'avancement and their wives seem to be equally concerned!)

Saturday After another very comfortable overnight train journey I arrived in the early morning at Bordeaux and as usual was met by a French Medical Officer who was in this case Medecin en Chef de 2ème classe Curnier who spoke some English but preferred his own language After breakfast and changing into uniform Curnier took me to the Medical School at Bordeaux Ecole du Service de Sante de la Marine where I was met with a formal welcome with the White Ensign flying from the yard arm of the main mast and a request by the Principal le Médecin Général de 2ème classe Hebrand to inspect the Guard of Honour This was followed by a tour of the School

Medical students who are destined for service as doctors in the French Navy start their training here Most pre clinical studies are in fact done in the School

but the more practical and clinical instruction is completed at the civilian medical college in Bordeaux From such observation as I was able to make I am quite sure that the training is up to the standard of the British Medical Schools

In addition to the medical work there is a considerable amount of drill as well as an intensive sports programme including skung sailing etc

The establishment, which is 60 years old reeks of tradition and must be a joy for both students and staff

Following the tour of the School I was taken to the civilian Medical Academy and shown the Laboratories and classrooms all of which were first class Like most Medical Schools it is hardly adequate to accommodate the growing number of students and in this case had extended into a nearby four storey garage which had been converted into lecture rooms On top of this garage was the most impressive lecture theatre I had ever seen It had accommodation for 800 students and was built with attractive wooden rafters and ceiling resembling the inboard hull of an upturned wooden ship The acoustics were excellent. The only apparent draw-back was that this splendid room on the fourth floor was served by one lift which accommodated four persons No doubt the youthful students would steam up the ramps which had been built to take cars

There was still time before lunch for a quick visit to the National Centre for Sciences which was a most impressive new college covering all the various scientific disciplines one I visited being the Department of Botany where two electron microscopes were in continuous use for the study of cellular anatomy

A formal lunch party had been arranged in the official residence of the Medecin Général to which as well as the officers and their wives the British Consul and his wife had also been invited There was the usual sequence of aperitifs wines champagne and liqueurs with really excellent food The womenfolk were quite fabulous

In the afternoon the Médecin Général and his wife took me for a tour of the vineyards of the Medoc area in an official car with a Naval rating at the wheel (Throughout the visit to France on all occasions Service cars were driven by Naval ratings) The tour of the vineyards inevitably necessitated steps to investigate the techniques and taste the wine. One could not help having the impression that there was a close connection between the sparkle in the wines and the lights in the eyes of the local ladies!

After a lightning change I was once more picked up by le Medecin Général and taken to a Chinese supper just the two of us This was particularly enjoyable as Monsieur Hebraud had himself served in a Yangtse Gunboat just about the same time as I had and naturally we had plenty to talk about This meal was followed by a visit to the theatre in Bordeaux which is said to be the finest in France and I can well believe it The show was an innocent musical beautifully produced but lacking the sauciness one would expect in this country What was interesting however was that though we were accompanied by Madame Hebraud throughout the performance the Medecin General and I stayed in the Mayor's Box

which was strictly men only while his wife sat over the fence in the circle I asked the reason for this isolation and learnt that the Mayor's box was so restricted because the number of persons entitled to use it was considerable that any suggestion of wives being included would only lead to considerable haggling for places

It was with profound regret that I had eventually to say goodnight to these hospitable and charming people So far this had been the highlight of the tour

Sunday This was a day of travel by train to Brest A rather roundabout slow but pleasant journey leaving Bordeaux at 7 35 and arriving in Brest at 1750 Even at this late hour on Sunday night I was met by Medecin Principale Lestage and taken to a very comfortable and modern hotel I was free for the evening and able to enjoy a fish supper near the water front

The first impression of Brest is one of a city which has been completely rebuilt after war time demolition and has the same tidy newness as Plymouth

Monday Also staying in the hotel was Medecin General de 2ème classe M Constans who met me at 9 o clock in the morning and after a visit to his office took me to the Prefecture du Maritime to call on the Admiral (four stars) Amman a most charming and courteous officer who told the Medecin General that I could see anything I wished in Brest including his own underground headquarters

The Prefecture de la Marine is a new building in the setting of a ruined fort overlooking the harbour The first visit this morning was to the Boys Training Establishment which resembles in many ways HMS Ganges A complete tour of the establishment was made and the accommodation in general was of the highest standard and the galleys and mess decks modern and attractively decorated (the galleys had Aga stoves which burnt Russian Anthracite) There was one menu for all officers men and boys alike—a simple breakfast with lunch the main meal Wine was served with lunch and beer in the evenings The Sick Quarters attached to the establishment was comparable with our own

After a drive through the Dockyard the underground headquarters was visited This is a NATO establishment with accommodation for 6 000 or more with a very efficient automatic ventilation control which ensured a perfect environment in all conditions It was dry cosy beautifully decorated and contained a large and completely self contained hospital Every entrance had facilities for radiological decontamination should this be necessary

One thing that impressed me very much in all French Naval establishments and hospitals alike is that every bed has a plastic over all cover which is in place during the day These are produced in many colours and give dormitories and wards an air of freshness but one wonders to what extent these may inhibit the airing of bedding

During the tour of the underground shelter I was taken into the Admiral's quarters briefing and control rooms Nothing appeared to be hidden from me and there was evidence of wall charts of recent NATO exercises

After this tour there was a formal lunch at the hospital with all the staff The resident Padre was of course Roman Catholic but I was assured that a

non conformist Chaplain paid regular visits For this event my notebook which I compiled as I went along reads Martini in Wardroom and for lunch—shrimps oysters sole duck apple pie fruit and coffee with white and red wine champagne and cognac—phew! As on previous occasions the only toast was The Queen

The afternoon included a tour of the Naval Hospital which had been rebuilt on the old site after German bombing There was evidence in the hospital too of underground shelters built by the Germans and during the tour of the harbour I had been shown the reinforced concrete submarine pens also constructed by them The present hospital is up to date and has every possible facility from modern laboratories to padded cells Visitors are allowed every afternoon

In the evening Médecin Général Constans accompanied by Medecin en Chef de 1ere classe Courtier the Medical Officer in Charge of the Hospital and his wife escorted me again in an official car on a tour round the coast via Cap Finistere to a charming hotel in the Baie des Anges a favourite haunt of yachtsmen The Brittany coast though very wild and somewhat sombre has excellent roads and magnificent scenery A supper of crab chicken cheese and fruit with the usual wines and coffee was arranged in this hotel after which somewhat exhausted I was taken to the home of Monsieur Courtier for a final whisky This was a particularly friendly evening and the Médecin Général though he spoke no English had a remarkable ability in emphasising his speech by expressive gestures The whole party had a fresh sense of humour and questioned me eagerly on our reactions to Christine Keeler and Profumo I had thought Bordeaux to be the highlight of the trip but Brest was equally exciting One thing that struck me however about Brest was that although there was an extensive Naval community many sailors officers and men preferred to leave their families behind in more agreeable parts of France this area being somewhat wild is very much a haunt of artists

Tuesday Another leisurely day of travel this time leaving Brest at 1050 to arrive in Cherbourg for 2012. The whole journey being done by a series of small diesel rail cars relatively comfortable and not too overcrowded. The scenery throughout being quite beautiful and in the early part of the journey rather wild The sun continued to shine as it had done ever since leaving Paris Every coach in each train had a large poster warning travellers of the risk of drinking more than one litre of wine a day as this produced cirrhosis of the liver! The stations in the wilder part of this journey had names not unlike those in Cornwall and some of them had lady Station Masters Many of the passengers were little white haired old ladies with delicate lace caps They did not however seem to expect much help from the male sex for on one occasion when I helped to lift a heavy suitcase from the rack.. the woman was so surprised that she turned and tried to help me down with mine!

In one of the small villages I was very surprised to see a shelter built beside a river where the women folk came down to do their laundry

After this long and pleasant journey I was received with the usual courtesy at Cherbourg and met by Médecin en Chef de 2ème classe Huraux who like me had a wife born in Sheffield and spoke English with a Yorkshire accent which was very refreshing We had a quick but welcome dinner at the Hospital (usual whisky white and red wine soup pork mushrooms cheese and fruit) after which a bed in the Naval Club was most welcome

Wednesday In the morning the last of my tour I was met by Dr Huraux and taken to call on the Medecin Général de 2eme classe Quero whose offices were in the Naval Hospital With him I was taken to call on the Executive Admiral of the Port, Lahaye who had spent many years in England and spoke the language perfectly He was charming and insisted on being photographed with the two of us The Press was also present This was followed by a tour of the hospital the port and a very interesting war museum which was full of relics of the occupation and relief of the city The Medecin Général accompanied me throughout the morning and I had a quick but characteristic lunch which had to be short as I was leaving France at 1 30 that afternoon Le Médecin General and Monsieur Huraux took me to the airport assisted me in spending my last francs on spirits and scent and saw me safely aboard the plane Thirty minutes later I was in Hampshire

Reviews

PRACTICAL PROCEDURES IN DIAGNOSTIC RADIOLOGY By H M Sexton and Basil Strickland Pp xn + 276 51 illustrations. London H K. Lewis Ltd Price £2 10s

This book includes in one volume most of the modern and accepted radiological techniques It eschews the more exotic procedures reserved for Special ist X ray Departments and omits all Barium work and Tomography

In the procedures described it includes those small but important details normally passed by word of mouth Each method is complete in itself as a technique used by the authors or their contributors As such it should be adopted with confidence whom the procedure is new to the reader the methods described can also provoke critical consideration of one's own techniques Thus the section on urinary sention gives a comprehensive description of IVP s and retrograde examinations and a method for routinating nystography

The section on miscellaneous investigations includes Dacryocystography which is not in my experience in as general demand as the other techniques described The very full description of Bronchography would be useful to the House Physician as well as the trainee Radiologist whilst the descriptions of Arthrography and Presacral pneumography are examples of the newer techniques now in more general use

The section on Biliary Tract investigations contains a full description of Operative Cholangiography which would be of interest to Surgeons not familiar with the essential minutiae of the technique of this examination

The section on Vascular Radiology contains the essential details of the preparation and care of catheters with details of their specification and suppliers The authors rightly point out that no Radiologist should undark on these procedures without some practical instruction under supervision Portography splenoportography phlebography venocavography splenoportiography and intra osseous venography are all clearly and adequately described The Sendinger technique of selective catheterisation is detailed There is a useful description of Intra venous aortography which has been so popular in America but somewhat neglected in England The main contra indications of all investigations are given but otherwise the description is technical

This book is primarily for the DMRD trainee It is also intended for the post graduate returning from overseas with but little experience or training in the newer special techniques

Since the Inception of Radiology has in its combination of intellectual with practical interest this book will help all Radiologists to extend the range of procedures in which they are competent.

The book would be of value in any X ray Department and would be usefully scanned by all interested in the capabilities of modern Radiology or a diagnostic tool J A B B

PRACTICAL HAEMATOLOGY By J V Dacie MD(Lond), FRCP(Lond) and S. M Lewis FSc MD (Cape Town), DCP (Lond) Third Edition Pp vii + 435 London J & A Churchill Ltd. 40s.

In this new and expanded edition of a well known work Professor Dacie is joined by Dorothy Lewis as co-author The book follows the familiar lines, but much of the irritating small print of former editions has been eliminated

The increase in size has been brought about by the revision of text and the addition of new chapters including sections on the use of radioactive isotopes and the investigation of megaloblastic anaemias and biochemical methods have been gathered into a single chapter

This is now a comprehensive work on its subject The sections on Basic Haematological Techniques and The Use of Haematological Techniques in Clinical Medicine will be most often referred to in the general clinical laboratory but the extensive sections devoted to haemolytic anaemias and coagulation disorders which rarely come the way of the Naval Hospital provide all that is necessary for an accurate diagnosis in such conditions (provided that one has access to suitable control material)

In any microscopic technique the details of the various techniques available may be the personal haematologist to perform the tests even if to be carried out in another laboratory because throughout the emphasis is on the systematic investigation of blood disorders in a step by step fashion rather than the use of random or routine tests

The authors have included black and white photomicrographs of red blood cell abnormalities but valuable as these are they serve mainly to whet the appetite for a similar treatment of the animated wills of blood and bone marrow in health and disease This was planned in colour photography but regretfully abandoned by the authors on grounds of expense Those who have seen some of the material available will share this regret and hope that the plan will one day be revived

Dacie and Lewis is assured of a place in the laboratory indeed it is a most essential piece of equipment D O H

An Outline of Pulmonary Function and Pulmonary Emphysema. By Eugene Roseman MD. Pp xii + 137. Many illustrations. Springfield Illinois: Charles C. Thomas Publisher. Price $6.50.

An understanding of modern basic physiology of pulmonary function is essential to the physician surgeon and anaesthetist but information has had in be obtained largely from the current literature with the result that confusion has become complete.

Dr Roseman Assistant Clinical Professor of Medicine (Thoracic) at Loma Linda University School of Medicine Los Angeles has set himself the task of remedying this state of affairs. In the first part of his book he reviews pulmonary function tests and their use in the clinical study of pulmonary physiology. This text is presented dramatically almost in note form which does not make for easy reading, but it is a mastery ece of lucid brevity.

The second part of the book contains a useful discussion on the clinical and pathological aspects of emphysema and its treatment while the last 20 pages are devoted to The Syllabus in which the earlier chapters are summarised. Finally there is a bibliography of 207 papers published during the last 20 years.

Dr Roseman has provided a monograph on modern pulmonary physiology which will become a friend to candidates for higher qualifications and they will thank him for his clear thinking.

J M C

Questions and Answers in Ophthalmology. By Harvey D. Wright, BSc, in Phil MD. Pp 354. Springfield Illinois: Charles C. Thomas Publisher. Price $10.75.

This volume contains about twelve hundred questions relating to all branches of clinical and academic ophthalmology. The answers to these are brief and clear. When the query concerns anatomical matters or established physiological principles the reply will not be disputed, but when the text ventures into the complex clinical field the replies must be the author's own opinions related to his personal experience. These are most valuable but will not be unreservedly accepted in every instance.

There must be few practising ophthalmologists who could read this book in its entirety yet fail to find some information which they have forgotten or indeed some facts of which they were not previously aware.

The printing of the book and its general arrangement are excellent.

D F G

Advances in Cardiopulmonary Diseases. Vol. II. Edited by Andrew L. Banyai MD FCCP and Burgess L. Gordon MD FCCP. Pp 347. Illustrated. London: Lloyd-Luke (Medical Books) Ltd. Price 90s.

This is the second volume of selected lectures delivered in the postgraduate courses presented by the Council on Postgraduate Medical Education of the American College of Chest Physicians. The first volume published in 1963 covered lectures delivered in 1961 and we are now provided with a further valuable selection from lectures given in 1962.

Once again the range of subjects is wide — from alveolar gas exchange, the clinical and radiological aspects of chronic bronchitis and emphysema and the mechanics of breathing to sarcoidosis drug resistance and its management in pulmonary tuberculosis and the role of hypercoagulability in coronary artery disease. Each lecture forms a chapter complete in itself with a useful bibliography and the line illustrations and reproductions of radiographs and electrocardiograms are of excellent quality.

The value of this book lies in the stimulus that it gives to the physician and surgeon to acquire a modern physiological approach in cardiovascular and pulmonary disease. If there must be criticism it can only be that we look forward to the next volume appearing one year and not two years after the lectures were presented.

J M C

Atlas and Manual of Dermatology and Venereology. By Burkhardt and Epstein. Second edition. 306 pages. 187 illustrations (99 colour plates). London: Bailliere Tindall & Cox Ltd. Price 132s.

As stated in the preface to the Second Edition this book is intended primarily for the use of General Practitioners and non-dermatological specialists and in this intention the book succeeds admirably though its appeal may be curtailed somewhat by its high price.

The illustrations of dermatological lesions are superb especially the coloured plates which are a tribute to the modern photographers art. This edition should be looked at by all who wish to quickly revise their knowledge of the appearance of skin conditions. The accompanying text is adequate for its purpose.

In the small section on Venereology it is a pity that Non-Gonococcal Urethritis is not placed firmly among the Venereal Diseases instead of Other Diseases of the Genitalia. While non venereal factors may play a part in its production and indeed may be the prime cause in some cases there is no doubt that the majority of non gonococcal urethritis is acquired in a true venereal manner. As a problem both of transmission and of treatment non gonococcal urethritis ranks high in the Venereologists mind at the present time. This is a minor point however in a book which gives so much visual information to the non specialist.

E. H. S

Conybeare's [illegible] Edited [illegible] Living [illegible] Pp xix + 1048 Fourteenth Edition [illegible] & Edinburgh E & S Livingstone [illegible]

A volume [illegible] textbook must fill a gap in the range of [illegible] stated in the style being very readable but [illegible] provided conforms to this advantage [illegible] few words and the advantage of qualifying [illegible] found in larger and more dispersive [illegible] means nonmention on the main common [illegible] Johnson eminent gentleman contributed [illegible] judge it which by the way in which topics have been treated [illegible] has put to the knowledge. The section on drowning shows confusion between [illegible] diving and skin diving in the aetiology and no mention is made of whole blood [illegible] in this section as a therapy in favourable circumstances. Seasickness may have been [illegible] but the mention of an antihistamine for treatment is made [illegible] in list on which benadryl does not find a place. Oxygen is recommended in [illegible] in overall occasions but no mention is made of the lung damage caused by pulmonary [illegible] — a matter of importance nowadays with the increasing use of high pressure oxygen chambers which themselves are not mentioned. When the vast majority of [illegible] have had an attack of decompression sickness and an efficient treatment programme is immediate treatment of 2 per cent of compressions ending in an attack it cannot be said that as soon disease has been largely abolished — in fact continuing work [illegible] changes in such workers. The outline of decompression by stages [illegible] Recompression as the most essential part of treatment of post decompression shock in aviators divers and sometimes air workers although advocated 30 years ago but only used in the past 4 years was probably not known early enough in the pathogenesis of the bends to be unfolded A feeling of dismay was engendered on finding these blemishes in an admirable edition of a standard compounded by knowledge of the faults in that volume It is to be hoped that if a reprint is considered important enough to qualify for inclusion in Conybeare then more careful checking will be done before the next edition appears so that perfection can be restored in a standard work

D E M

Nutrition Exercise and Body Composition By Ernst Jokl MD Pp vi + 115 Some illustrations Springfield Illinois Charles C Thomas *Publishers* Price $5 75

A further publication by Jokl is a numerical sequence to his previous works on Sports Medicine and Cultural Anthropology This book presents a more statistical approach The important connection between nutrition and athletic performance is emphasized in the first three chapters and the importance of obesity underlined A series of nonstriking tools are documented to support the arguments

One of the possible dangers of exercise which is thought not is that whereas muscular development may be profound almost at will there is a danger that once exercise has ceased an increased appetite may result in alimentary obesity The figures on page 30 are a striking example of this Similarly on page 68 skin fold thickness is shown to be reduced during a period of exercise and when the exercise ceases this measurement increases by twice that of the reduction during exercise

The latter part of the monograph is concerned with the statistics of body measurement and describes many methods and suggests particularly useful means of data recording The final emphasis of the integrative function of the nervous system in exercise is identified as an important factor worthy of further study

The book is easy to read very well illustrated and mentions much food for thought S M

Scope of Exercise in Rehabilitation By Ernst Jokl Pp x + 128 Illustrated Springfield Illinois Charles C Thomas *Publishers* Price $5 75

A fourth book by Jokl emphasises further the strong emotional impact of physical fitness Examples given in earlier chapters where physical handicap has been conquered by supreme devotion and courage are extremely encouraging and impressive

There are some extremely beautiful photographs of athletes in action and the text emphasises the importance of sensory domination of muscular control and the significance of the upright posture Examples are also given of adaptation to congenital absence of muscles The latter part of the book is of considerable clinical importance demonstrating rehabilitation by exercise of patients with cardiovascular disease This extension of physical rehabilitation beyond conventional practice is a challenging concept worthy of further consideration

The presentation of the book maintains the high standard of its predecessors S M

STEROID CHROMATOGRAPHY By R. Neher. Second [illegible] Basel: Publishing Co Ltd. Price 60s.

This monograph translated from the German [illegible] laboratories at Basel. He reviews the applications [illegible] separation identification and quantitation of steroids and [illegible] substances [illegible] practice and in other published work. The longer established methods [illegible] paper chromatography are dealt with very fully and their important [illegible] steroid chemistry is mentioned. The more recent methods of thin layer [illegible] tography applied to analysis of steroids are also covered. The treatment [illegible] and there are comprehensive tables of recommended supporting media [illegible] and detectors for the separation of the various compounds with discussion of the [illegible] advantages and their solutions. Collected data of the known mobilities [illegible] in different solvent systems are given. The interchange between [illegible] chromatography mobility and molecular form and active groups is briefly discussed. [illegible] of these techniques to clinical problems and their contribution to the understanding [illegible] function are relegated to the references these total 909 mainly recent technical.

This thesis is a work of relevance to chemistry and as such will be [illegible] used by laboratories specialising in this work. There is a little in this work for the [illegible] immediately applied to the handling problems of steroid chemistry met in the clinical pathological laboratory.

D O H

HEART AND SPORT. By Ernst Jokl MD. Pp vi + 115. Some illustrations. Springfield Illinois: Charles C Thomas. *Publisher*. Price $6.00.

This monograph is a series on Sport and Medicine it takes a more specialised and clinical view giving a series of considerations by the author and their workings on the effect of exercise and organised sport on the anatomy and efficiency of the heart.

The general theme is to produce suitable evidence that adequate training and continual exercise increases the efficiency of the heart and lessens the risk in later years of coronary thrombosis. In one series of follow ups in a large group of athletes it was found that No member of the group developed coronary artery disease who continued to take active and strenuous exercise throughout the rest of his life. Warning however is given that physical fitness itself is no protection against infarction and many instances are cited where leading athletes have been diagnosed by stab infarctions. Furthermore it is shown that there is considerable risk with the taking of exercise during the incubation period of immediately following an infection of producing adverse effect. This is an important lesson which is not as fully appreciated as it should be.

This book then is of considerable value and a very important contribution in the field of Sports Medicine.

The standard of the production is as high as its predecessors though like them the habit of interrupting the main flow of the text in sub paragraphs and notes in small print causes some inconvenience. There is one gross printing error on page 38 where an important paragraph ends in the middle of a word to be completed in the middle of the sentence on page 100. In other words 13 lines on page 100 belong to page 98. This is a serious error and should be corrected as soon as possible.

S M

THE CARE OF THE INJURED By P. A. King. MS FRCS. Pp vii + 163. Illustrated. London and Edinburgh: E & S Livingstone Ltd. Price 25s.

A considerable amount of useful information and advice on the management of casualties has been packed into the 160 pages of this little book.

The initial chapters deal with the first aid and early hospital management of casualties with the correct emphasis being placed on the maintenance of respiration and the prevention of early treatment of shock by blood transfusion. Transfusions of 10 or more litres of blood (470 bottles) are not uncommon (P 9).

The remainder of the book deals with the methods of treatment and possible complications of most varieties of injury.

The book is well written easy to read and illustrated with many photographs of a large variety of fractures and some simple but clear line drawings.

Written for the information of the nursing staffs of casualty and accident departments this book will help them to appreciate why certain lines of treatment and certain techniques are necessary.

For the S.R.N.A. working on a ship especially without a doctor it could be a very reassuring companion. For the doctor with far distant unskilled companions it is an excellent précis of the modern management of injuries. For the medical student or newly qualified doctor it is a good introductory handbook to a fascinating but regrettably hardly taught subject.

Mr. King is to be congratulated on writing this excellent account.

P G B

ACCESS AND EXPOSURE IN ABDOMINAL SURGERY. Hugh Dudley, Ch.M., F.R.C.S., and Peter Jones, M.Chir., F.R.C.S. 72 illustrations. Pp. xii + 148. London: Lloyd-Luke (Medical Books) Ltd. Price 25s.

This is a very readable book on a subject which has never been treated adequately in any of the major works on operative surgery. It therefore makes good a long-standing deficiency in this field.

The authors deal meticulously with every aspect of the surgery of access as applied to the abdomen. They consider the positioning of the operating team, discuss skin sterilisation and the disposition of skin drapes; they even include a short dissertation on the design and proper use of the surgical knife. The principles and techniques of wound closure are equally thoroughly dealt with and there is a separate section in which wound drainage and the formation of stomata are discussed.

From this general section the book goes on to consider each separate incision and approach used in abdominal surgery. The descriptions of technique are clear and easy to follow and this clarity is further enhanced by a remarkable series of excellent line drawings. In an age of increasing complexity and technicality it is refreshing to find a book written in such simple and easily understood terms as this. It is commendable too that the authors take nothing for granted and are unafraid to include even the most elementary details in their descriptions of technique.

The book is mainly intended for those in the early part of a surgical career and it should prove for them a most useful and practical volume. It nevertheless has much to offer even those well-established in surgery. Dealing as it does with basic facts and the application of first principles of surgery this book will still have its place on the bookshelf when the vast majority of its contemporaries are sadly out of date. N. J. B.

We acknowledge with thanks the receipt of the following publications:

Acta Medica et Biologica. Annales Medicinae Militaris Fennicae. Annals of Tropical Medicine and Parasitology. Australian and New Zealand Journal of Surgery. British Journal of Surgery. British Medical Journal. U.S.I. News Roundup. Bulletin of World Health Organization. Dermatologica. Geriatrics. Guy's Hospital Gazette. International Review of the Army, Navy and Air Force Medical Services. Japanese Journal of Medicine. Journal of the Irish Medical Association. Journal of the Royal Army Medical Corps. La Medecine. Lancashire. Mayo Clinic Proceedings. Medical Digest. Medical Journal of Osaka University. Medical Services Journal Canada. Middlesex Hospital Journal. Nagoya Journal of Medical Science. Revista Medica del Hospital Colonia. Revista de Sanidad Militar. Revista Internacional de Medicina y Cirugia. Sao Paulo. Revista Medica. Revista de Medicina Aeronautica. Revista Espanola. Studies. Ulster. St. Mary's Hospital Gazette. St. Thomas's Hospital Gazette. The Kentish Medical Journal. The Ulster Medical Journal. Tuberculosis Reports on Biological Medicine. Tropical Diseases Bulletin. University of Newcastle upon Tyne Medical Gazette. WHO Chronicle. X-Ray Focus. Yonago Acta Medica. Yokohama Medical Bulletin.

News of the Service

OBITUARY

Surgeon Lieutenant Robert MacDonald MILNE MB Died on the 15th September 1964 (road accident) at the age of 28 years
He qualified MB ChB and entered the Royal Navy Medical Service on the 7th June 1964

HIGHER QUALIFICATIONS

Surgeon Commander A S Falconer	MRCOG
Surgeon Lieut-Commander D W D Evans,	MRCOG
Surgeon Lieut-Commander D H Elliott,	D Phil (Oxon)
Surgeon Lieut-Commander J K Campbell	MRCP (Edin).
Surgeon Lieut-Commander K P S Lumley	DIH
Surgeon Commander J G H Sheppard	DPH
Surgeon Commander D G Dalgliesh	DPH
Surgeon Lieutenant J A Savin	DIH

PROMOTIONS

To Surgeon Lieutenant Commander
J C Twomey MB BCh D Obst RCOG R F Weeks MB ChB M H Parsons BM BCh D Obst RCOG R L Owen MB BS J Shaw MA MB BChir J B Reynolds MRCS LRCP N Carr MB ChB D Obst RCOG J M Beeley MRCS LRCP D Obst RCOG

To Surgeon Lieutenant Commander (D)
B K Osborne BDS, LDS

PRE-REGISTRATION ENTRIES

L F Ramsey K C Bruskill C A Alexander M J M Barker A B Leach J P Beavis T L Moody A P Steele-Perkins D P A Stones R J Fitzgerald R D Cole R A Cavanagh

TRANSFERRED TO THE PERMANENT LIST

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Surgeon Lieutenant Commander (D) B Robinson LDS and Surgeon Lieutenants (D) M J Ralph LDS J L Bradbeer BDS

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Surgeon Captain T F Davies LMSSA
Surgeon Commander (D) S J Atkinson LDS

RELEASED ON COMPLETION OF SHORT SERVICE COMMISSION

Surgeon Lieutenant Commanders P S. Hunter P Dent J H Beeley F R Wilkes, J B Reynolds J M Laurent.
Surgeon Lieutenant Commander (D) B H Hill
Surgeon Lieutenants J A Savin R R Evans S Tetlow K I M Mills H D H Eastwood

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PROMOTIONS

To Acting Wardmaster Sub-Lieutenant M L W Purver

RETIREMENTS

Wardmaster Lieutenant F K Tomlinson *BEM* and D E. Milligan

QUEEN ALEXANDRA'S ROYAL NAVAL NURSING SERVICE

PROMOTIONS

To Principal Matron Miss A J Mitchell ARRC
Matron Miss F P Palmgren ARRC

RETIREMENTS

Miss A A E Burman RRC Principal Matron

ROYAL NAVAL RESERVE

PROMOTIONS

To Surgeon Lieutenant Commander C E Kidd MD PhD DPM

RETIREMENTS

Surgeon Commander P Millyard MB BS.

CIVILIAN APPOINTMENTS OF RETIRED ROYAL NAVAL MEDICAL OFFICERS

Surgeon Captain H E B Carpel to H.M.S. Ganges
Surgeon Commander C M Lamont to H.M.S. Condor

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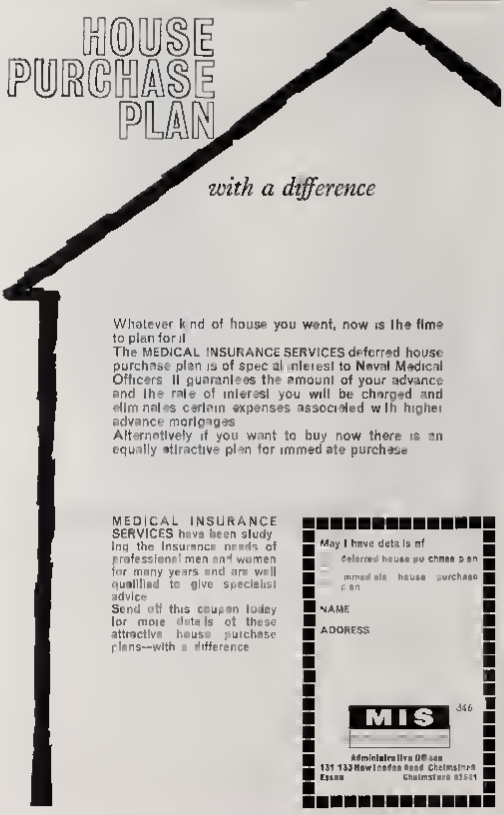
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